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## CONTENTS

A CONSIDERATION OF SECONDARY ANEMIA.
*W. H. Long, M.D.*, Fargo, North Dakota.... 499

ENDOMETRIOSIS.
*Frank E. Kliman, Ph.C., B.A., M.D.*, Duluth ..... 504

OFFICE TREATMENT OF CHRONIC CERVICITIS.
*Susan R. Offutt, M.D.*, Rochester..... 507

THE NEUROLOGICAL ASPECT OF HEAD INJURIES.
*William H. Hengstler, M.D.*, Saint Paul.... 509

TREATMENT OF SECONDARY DEFORMITY IN CASES OF HARELIP.
*Gordon B. New, M.D.*, and *Frederick A. Figi, M.D.*, Rochester..... 514

CARDIAC EMERGENCIES.
*John M. Lajoie, M.B. (Tor.), M.D.*, Minneapolis ..... 517

DIFFERENTIAL DIAGNOSIS OF ENDOCARDITIS.
*Harry L. Smith, M.D.*, Rochester..... 521

AN UNEXPLOITED THERAPEUTIC OPPORTUNITY IN PERIODIC HEALTH EXAMINATIONS OF YOUNG ADULTS.
*Norman Johnson, M.D.*, Minneapolis..... 526

SPINAL ANESTHESIA.
*Ralph M. Tovell, M.D.*, Rochester..... 531

OBSERVATIONS ON SEROTHERAPY IN SCARLET FEVER.
*Alex Stewart, M.D.*, Saint Paul..... 537

CONGENITAL HYPERTROPHIC PYLORIC STENOSIS.
*Oswald S. Wyatt, M.D., F.A.C.S.*, Minneapolis ..... 540

CASE REPORTS:
Hyperthyroidism Complicating Diabetes Mellitus.
*R. C. Webb, M.D., F.R.C.S.*, Minneapolis 546

Pachymeningitis Hemorrhagica Interna.
*Robert Rosenthal, M.D.*, Saint Paul..... 547

Bilateral Spontaneous Pneumothorax: Report of a Case.
*Harry G. Wood, M.D.*, Rochester..... 550

Sarcoma of the Throat.
*J. A. Watson, M.D.*, Minneapolis..... 552

Double Branchial Cysts Complicated by Carcinoma of the Larynx.
*Arthur L. Herman, M.D.*, Minneapolis.... 555

PRESIDENT'S LETTER ..... 558

EDITORIAL:
Streptococcus Vaccination in Chronic Arthritis ..... 559
The Strange Case of Diabetes..... 560
University Hospital Staff Reports..... 561

OBITUARY ..... 561

COMMITTEE ON PUBLIC HEALTH EDUCATION.... 562

OF GENERAL INTEREST..... 563

MISCELLANEOUS ..... 564

CONSULTATION BUREAU ..... 566

REPORTS AND ANNOUNCEMENTS OF SOCIETIES
Medical Broadcast for the Month..... 567
The Recent State Meeting..... 567
American Proctologic Society..... 567
Pan-American Medical Association..... 567
Stearns-Benton County Society..... 567
Minnesota Radiological Society..... 568
Red River Valley Society..... 568
Upper Mississippi Medical Society..... 568
Interstate Post Graduate Medical Association of North America..... 568
Women's Auxiliary ..... 568

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE ..... 570

PROCEEDINGS OF THE MINNEAPOLIS SURGICAL SOCIETY ..... 574

PROGRESS:
Medicine ..... 590
Pediatrics ..... 593
Surgery ..... 594

NEW AND NON-OFFICIAL REMEDIES..... 594

BOOK REVIEWS ..... 595

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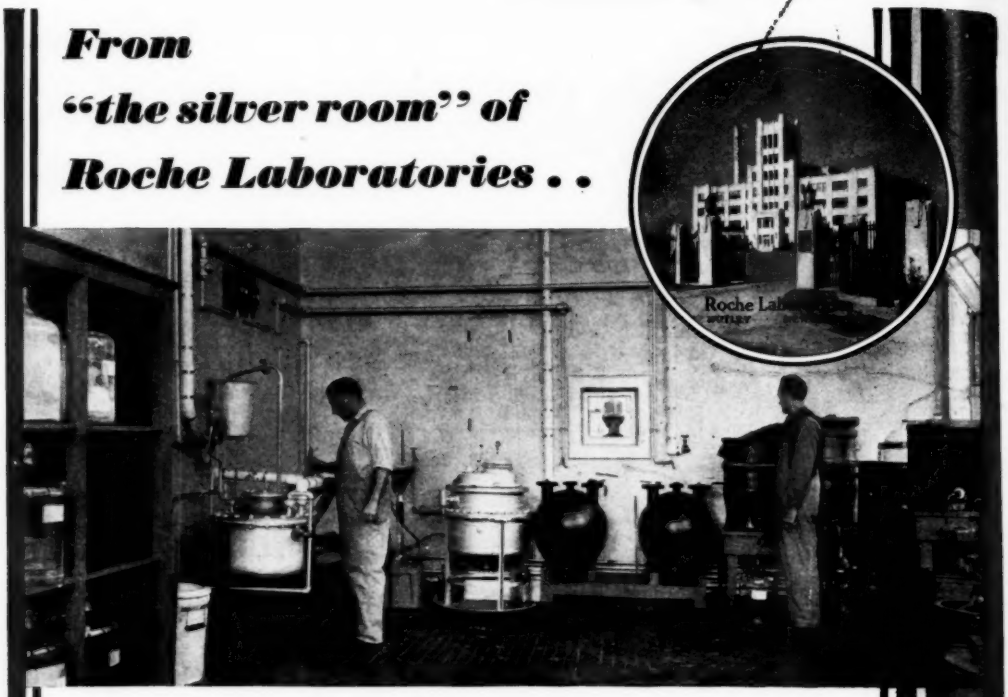

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# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.*

VOL. XIV JUNE, 1931 No. 6

## A CONSIDERATION OF SECONDARY ANEMIA*

W. H. LONG, M.D.
Dakota Clinic
*Fargo, North Dakota*

THE frequency with which we encounter patients with secondary anemia justifies a review of the subject. Their successful management depends upon the ferreting-out of the primary cause of the condition and remedying that condition. We must carry out active measures directed to the restoration of the blood to normal. A prescription for Blaud's mass and the advice, "Eat plenty of liver," will not suffice.

The term secondary anemia includes two groups: the anemias which can be attributed to a primary cause, and the group of cases which present similar characteristics but which must be classed idiopathic secondary anemia because we are unable to ascertain the primary cause. The primary cause may be increased blood loss from hemorrhage, either acute or chronic, or deficient blood formation from depression of the marrow by the presence of toxins of various origin.

The blood findings characteristic of secondary anemias are definite. The hemoglobin reduction is prominent, and the red count less strikingly reduced. This gives us constantly a color index of less than one. The leukocytes are normal in number except in long-standing cases where the bone marrow has become exhausted. The stained smears show achromia or faint staining and a tendency of cells to be smaller than normal with varying degrees of deformity. With an active marrow there is a considerable polychromatophilia, while in long-standing cases, with a depressed marrow, very little is to be found. Reticulated cells are found in about the normal percentage.

The classification of secondary anemias, according to the grouping suggested by Watkins, is interesting and will prove helpful in further study of these cases. We have followed the shift in the leukocyte counts in these cases under treatment and, in prognosis, the careful study of the leukocytes is helpful. The cases with pronounced shift to the right are certainly more resistant to treatment.

Certain cases are encountered with a color index near one and perhaps with an associated achylia which are difficult to distinguish from primary pernicious anemia. The determination of the volume index, which is a measurement of average red cell volume, is helpful. The demonstration of increased bilirubin by the Vandenberg reaction or the icterus index test, which indicate increased blood destruction, may decide the proper classification. We have used the therapeutic test of feeding ordinary liver extract and following the reticulated cell count in two border-line cases, the absence of reticulate response being against the primary pernicious type.

The cases most easily recognized are those due to acute hemorrhage. The history usually is significant. Certain fundamentals are, at times, forgotten in managing such cases, and these may cause serious error. For instance, the hemoglobin and red blood count are not likely to be altered until six to twelve hours after the acute hemorrhage. The leukocyte rise is prompt and may reach 15,000 to 18,000. The predominant leukocyte is the polymorphonuclear. These points should be remembered in deciding between the possibility of intestinal tract hemorrhage and infection and in appraising the severity of hemorrhage. Fol-

*Read at the meeting of the Northern Minnesota Medical Association, Moorhead, Minnesota, September 20, 1930.

lowing the leukocyte and platelet• counts in intra-abdominal hemorrhage can be very helpful in the management of such cases. In all cases of acute hemorrhage, the determination of the presence of a blood dyscrasia, as the primary or as a complicating factor, is important. In purpura, the leukocyte count is likely to be lower and the platelet count is constantly low, the bleeding time increased and the clot does not retract normally.

The two following cases are typical examples of those due to blood loss and are cited to illustrate how little the patients were impressed by that blood loss and how closely they must be questioned to bring it out.

Miss D. P., aged 16, was referred as a case of chlorosis. The week before she had felt light-headed, dizzy and had had some headache. She became very tired, short of breath on climbing stairs, and three days before she had fainted. On direct questioning, after some hesitation, she remembered that the stools had been dark the past three days and that, for the past month, she had had an uncomfortable hungry sensation in the epigastrium in the mid-morning and mid-afternoon. The hemoglobin was 24 per cent, red blood count 1,220,000, white blood count 6,500, platelets 176,000, bleeding time 3 minutes, coagulation time 4 minutes, and the stool contained blood (Grade IV) and the X-ray revealed a duodenal ulcer.

R. B. P., aged 17, presented almost an identical history, attributing all his symptoms to the extreme heat of the summer and having overlooked entirely his black stools and having thought nothing of his hunger pains, both symptoms having been elicited only by the closest questioning.

Chronic blood loss is a much more frequent cause of secondary anemia. Here there are a long list of conditions which must always be considered: peptic ulcer, hemorrhoids, diverticulitis, intestinal polyposis, cirrhosis, menorrhagia—and it is surprising how frequently the patient has not been at all concerned by considerable amounts of continued blood loss. Here, again, it is essential to exclude possible complicating chronic purpura and, also, to determine the activity of the marrow by study of the presence of nucleated cells, polychromatophilia and the leukocytic type.

The two following patients presented themselves for the treatment of their anemia.

Mrs. G. L., aged 32, the mother of two children, gave a history of irregular menstruation lasting seven to fourteen days and requiring nine to ten pads daily. She had noticed that she bruised easily. Her father was subject to severe nose bleeds. Her mother bled excessively and a sister bleeds easily and excessively.

The laboratory reported: Hemoglobin 25 per cent, red blood count 2,670,000, white blood count 8,850 (p. m. n. 75.5 per cent, lymph. 21, mononuclear 2, transitional 4.5), anisocytosis II, poikilocytosis II, achromia II, bleeding time 3 minutes 35 seconds, coagulation time 8 minutes 30 seconds, platelets 84,000, normal retraction of clot.

The uterus was found to be slightly enlarged and of the hard fibrous type and a small mass was present in the right adnexa.

Dietary treatment with iron, arsenic and calcium was instituted.

One month later the hemoglobin was 39 per cent, red blood count 3,780,000, white blood count 6,500, platelets 112,000.

Following three transfusions the hemoglobin was 50 per cent, red blood count 4,730,000, white blood count 7,900, platelets 264,000.

On August 6, 1930, a fibroid uterus and cystic right ovary were removed. The spleen was examined and found not enlarged.

The transfusions brought about marked general improvement but the blood count did not improve satisfactorily. But for the right pelvic mass, radium or X-ray might have been used to induce temporary cessation of the menses until the blood had been restored to normal. The question of the presence of a chronic, hemorrhagic purpura was difficult to settle with the low platelet counts, but I think this diagnosis was not justified because of a normal bleeding time and a normal retraction of the clot.

Another such case was that of Mrs. P. E., aged 20, who had suffered from menorrhagia two years before but not since her marriage at the age of nineteen.

Her hemoglobin was 55 per cent; r. b. c. 4,900,000; w. b. c. 5,400. A mass was found in the right adnexa which proved at operation to be a cyst of the ovary. This and a small cyst on the left tube were removed.

In 1926 the patient was seen again. At this time, the blood showed a hemoglobin of 35 per cent; r. b. c. 4,170,000, index .4 plus; w. b. c. 7,150. The menstrual flow had been excessive and irregular, and a mass was present in the right adnexa.

At operation August 9, 1926 a double salpingectomy was performed for bilateral salpingitis and a right tubo-ovarian abscess was removed. Two transfusions were given. The hemoglobin rose to 42 per cent.

In spite of operation, the excessive flow continued and, on March 1, 1927, radium was given to produce complete cessation. General improvement was prompt and has continued well since. Hemoglobin has continued rather low, never exceeding 50 per cent until the past year. The blood picture now shows a hemoglobin of 76 per cent and r. b. c. 4,800,000. There were never any manifestations of purpura.

Certainly these cases are trying and it seems as though certain individuals are endowed with

a poor hemopoietic system. They show poor response to stimulating measures and are very susceptible to any chronic loss of blood.

The third and very common type of secondary anemia is that associated with chronic toxemias and infections. Common causes are tuberculosis, syphilis, chronic focal infections, malignancies, nephritis, and pregnancy. Faulty diet, poor hygiene and actual dietary deficiencies often play a large part in these. There is defective blood formation and likely some measure of increased blood destruction.

The blood picture in such cases is not characteristic. If long continued, the state of semiaplasia may become established. The smears should be studied for evidence of exhaustion of the marrow.

Of special importance are the anemias of pregnancy. We have encountered an unusually large number of patients with rather high degrees of anemia in the last trimester of pregnancy. In some of these, recovery has been very slow and, even after delivery, they have remained under par for long periods. It is important to ascertain its presence early, as the earlier treatment is carried out the better the result. Recently there have been numerous reports in the literature on the anemias of pregnancy and I think the condition is best summarized by Pepper as follows:

1. A mild anemia occurs physiologically in pregnancy.

2. The physiologic anemia may become severe in individuals previously anemic, also as a result of hemorrhage or of complicating infections, of which syphilis is apparently the most important.

3. Severe so-called pernicious anemia of pregnancy is not identical with Addisonian anemia (primary pernicious anemia). The grade of anemia may be as marked and certain features of the blood picture suggestive, but other essential criteria are lacking.

4. Sepsis may be the cause of such an anemia and the lack of leukocytosis does not exclude this possibility.

5. Early recognition of anemia beyond the "physiologic" grade, and prompt treatment will, in the majority of instances, avoid the development of the more severe grades of anemia, which, in the past, have been termed "the pernicious anemias of pregnancy."

The anemias associated with nephritis have likewise been the subject of many reports recently. The condition is so constant and the degree of anemia so parallels the severity of renal damage that it can be used as a reliable prognostic guide. The most complete report is that of Ashe, who studied 300 cases and concluded that the degree of anemia could be very helpful in deciding the degree of renal damage in cardiovascular-renal disease.

The anemias of syphilis, of chronic infections, arthritis, and of chronic ulcerative colitis are likely to be severe and are peculiarly likely to have an associated splenomegaly.

Possibly splenic anemia should not be mentioned, but, inasmuch as the anemia is of a distinctly secondary type, it is included. The essential features in such cases are the marked leukopenia and the associated hepatic cirrhosis.

One patient observed presented herself in October, 1926, because "she was run down." Her hemoglobin was 45 per cent, r. b. c. 3,240,000, index .7, w. b. c. 5,700. Examination was negative except for a severe sinus infection. The sinuses were operated upon and she was placed upon a suitable diet, iron and arsenic. Two months later, the hemoglobin was 60 per cent, r. b. c. 4,120,000, and the general condition much improved. At that time, there was a question as to whether or not the spleen could be felt. She returned in October, 1928, stating she had been well for one year after the last visit, when she began to have epigastric distress of an indefinite type and became weak and run down again. The blood picture was: Hemoglobin 35 per cent, r. b. c. 3,030,000, index .5; w. b. c. 1,750, platelets 162,000, p. m. n. 5, lymph. 78, trans. 10, mono. 5, anisocytosis II, poikilocytosis II, polychromatophilia slight. The spleen was markedly enlarged and hard. Splenectomy was performed November 24, 1928. Recovery was prompt, the blood picture improved rapidly, and one month later the hemoglobin was 64 per cent, r. b. c. 3,950,000, w. b. c. 5,200 on leaving hospital. She was heard from during the past summer and has remained in good health.

Why some individuals develop these rather severe degrees of anemia with these infectious processes and others do not is an interesting speculation. That they have a definitely vulnerable hemopoietc system is suggested by the occasional definite familial involvement. The following two families are mentioned because of the several members observed:

Mrs. C. W. C. was found upon examination to be suffering from amebiasis and a pelvic tumor, the nature of which was not determined. She had not suffered from menorrhagia. There was no free hydrochloric acid in the stomach contents. Her blood picture showed a hemoglobin of 35 per cent; r. b. c. 4,030,000; w. b. c. 6,900. She had been treated for anemia for the past four months.

Mrs. R. S., a sister, was found to have dental sepsis.

An endocervicitis and a blood picture showed the hemoglobin 55 per cent; r. b. c. 3,760,000; w. b. c. 5,950. She also had no free hydrochloric acid in the stomach.

Mrs. C. W. C., another sister, was found to be suffering from chronic constipation, chronic sinusitis, and had a hemoglobin of 40 per cent; r. b. c. 3,600,000; w. b. c. 6,250. She too had no free acid in the stomach contents.

These patients have all been restored to health, the first by eradicating the amebic infection and two transfusions. The other two did not require transfusions. A fourth sister was seen with a gastric cancer.

In the other family, Mr. E. G. presented a typical picture of primary pernicious anemia (hemoglobin 52 per cent, r. b. c. 1,880,000, index 1.4, w. b. c. 4,950). There was no free hydrochoric acid in the stomach contents and there was a history of glossitis. Stool examination showed many *Balantidium coli* present. It is interesting to note that the parasite was promptly eradicated by a series of neoarsphenamin treatments but the course of the disease not affected. He was seen first in 1927, is still under observation and promptly relapses if he neglects taking liver extract.

A sister, Mrs. A. F. N., aged 29, was found to be suffering from a sinusitis and dental sepsis. Her hemoglobin was 30 per cent, r. b. c. 3,490,000, index .4, w. b. c. 5,800. There was no free hydrochloric acid in the stomach contents. Neurological findings were normal.

Another sister, Mrs. C. S. G., aged 32, suffered from menorrhagia caused by a fibroid uterus. Her hemoglobin was 48 per cent, r. b. c. 3,760,000, index .6 per cent.

The treatment of secondary anemias consists in:

1. The care of the primary cause when it can be found.
2. Supplying adequate iron.
3. Stimulation of the hematopoietic organs.

Chronic blood loss from menorrhagia is certainly one of the most frequent causes encountered. In young women and girls, striking reduction in flow has frequently been obtained by one or two stimulating doses of X-ray to the ovaries. In more severe cases, we have induced temporary cessation by heavier doses of X-ray or by radium. In patients approaching the menopause, we give sufficient radiation to obtain complete cessation.

A supply of adequate iron is insured by feeding foods high in iron content and the administration of ferrous carbonate or of reduced iron. Whipple found certain fruits (apricots, prunes, and raisins) had a decidedly better effect than vegetables in restoring the blood after repeated blood losses. Of vegetables, spinach was the only one that was of special benefit. Our practice is to give a well-balanced diet, high in vitamins, with plenty of red meats, green vegetables, whole wheat bread, fruits and a daily portion of liver or kidney.

The use of liver in secondary anemia has been reviewed innumerable times in the literature since its use has become fixed in the primary anemias. Strikingly convincing are the reports of Whipple and of Keefer and Yang. Whipple found that dogs, rendered anemic by blood loss, regenerated their blood much more rapidly when fed on diets rich in liver and kidney rather than when fed muscle meat. Keefer and Yang followed the daily fluctuation in hemoglobin, red counts and the reticulated cell response in thirty-seven cases of secondary anemia and concluded that liver and iron, given in combination, were more effective than either given alone. In a more recent communication, Whipple reports the isolation of a palatable liver fraction potent in anemia due to hemorrhage. Such an active extract for use in secondary anemia will be a distinct addition to our present methods. Giffin has recently reported on the use of fetal liver, but that is very hard to obtain and is not likely to become readily available.

One method of stimulation of blood formation which is too often neglected and which practically never fails us is the use of transfusions. Two or three transfusions will restore these people more rapidly than any other means. The citrate method is entirely satisfactory, the reactions are but few and seldom severe. In any patient who is at all slow to respond and especially if there are any signs of semi-aplasia (that is, low white blood count, low polymorphonuclear count, low platelet count and absence of polychromatoplasia), we transfuse at once.

Arsenic is very valuable as an adjunct. Many times where ferrous carbonate alone has failed, addition of arsenic has brought about prompt improvement. We have used bone marrow extract in the form of hemogennin without especially significant results. Ultra-violet radiation, natural or artificial, is an important aid. The use of copper with iron has given us some strikingly good results.

## SUMMARY

1. Secondary anemia must be treated first by removal of the primary cause.

2. Care must be taken to exclude chronic pur-

pura in all cases of acute or chronic blood loss.

3. Closest consideration of the history is required in determining blood loss as the patient is often not sufficiently impressed.

4. Adequate dietary management to include abundance of vitamins, iron-containing food and the long-continued use of liver and kidney, as well as muscle meats, is important.

5. Drugs in the form of iron and arsenic have not been supplanted by newer means.

6. Transfusions are practically never-failing and are too often omitted in the management of secondary anemia.

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## AVERTIN

The Council on Pharmacy and Chemistry reports that Avertin was submitted for consideration in February of this year; that it recognizes the fact that the product presents certain desirable properties but that definite action concerning its recognition is postponed pending investigation of certain of its side actions now being conducted. For the information of the medical profession the Council submits a report concerning the present status of the drug. Avertin is tribrom-ethanol. It was introduced in Germany in 1926, to be used alone for rectal anesthesia, or to be supplemented by other narcotics, including morphine and ether. Later Avertin was offered in a solution, 1 c.c. of which contains 1 Gm. of Avertin dissolved in amylene hydrate (tertiary amyl alcohol). This solution has been the subject of several hundred reports. After reviewing the reported advantages and disadvantages the Council concludes: though the present evidence indicates that Avertin may prove valuable as a means of initiating narcosis but not for complete narcosis, the Council decided not to admit the drug to New and Non-official Remedies. (Jour. A. M. A., November 8, 1930, p. 1427.)

## DISINFECTANTS

In combating contagion, modern sanitary practices have eliminated disinfectants for spraying walls, ceilings and floors of school rooms. The source of infection is the individual; so long as the infected individual is present in the room, any disinfectant that might be used on the walls or the floor would be of little if any value in preventing infection. Removal of the infected individual usually suffices to end the danger of spreading the infection. Soap and water is the best agent for cleaning floors, together with plenty of fresh air and sunshine. Terminal disinfection, such as fumigation with formaldehyde, has been generally discarded as valueless. In the case of lavatories, urinals and toilet bowls, so-called germicides in reality accomplish nothing except covering up the primary odor by the stronger odor of the chemical used. "Disinfection of hands" may be obtained by a thorough scrubbing with soap and water. In laboratories in which pathologic material is being handled, a solution of mercuric chloride or a solution containing "compound solution of cresol" may be employed. (Jour. A. M. A., March 28, 1931, p. 1098.)

# ENDOMETRIOSIS*

FRANK E. KLIMAN, PH.C., B.A., M.D.
*Duluth, Minnesota*

MANY theories have been advanced to account for the presence of endometrium-like tissue in such places as the ovary, recto-vaginal septum, uterus, and in extragenital locations. No one theory, however, has been adequate to explain the origin of all these heterotopic growths.

The existence of endometriomata was known as early as 1899, when Russel reported the first case of endometriosis of the ovary. Due to the fact that cells of the germinal layer dip into the ovarian stroma and are cut off from the parent structure, they cannot be distinguished from endometrial glands. Because of his knowledge of this phenomenon, Russel claimed that endometriomata originated from the germinal epithelium.

Cullen holds that endometrial growths arise from aberrant Müllerian rests. Sampson, on the other hand, supports the view that endometrial cysts are the result of implantation and development of uterine epithelium which has escaped, with menstrual blood, through the Fallopian tubes. Other authorities disagree with Sampson, claiming that if his view were correct we should expect to find more cases of endometriosis following such uterine manipulations as curettage, transuterine insufflation, lipiodol injections, etc. Halbane believes that endometriosis spreads along the lymphatic channels, whereas Lockyer has brought out the serosal theory.

The serosal theory is based on investigation which shows that all genital epithelia are derived from the urogenital fold. From this fold are developed the lining of the Müllerian ducts, the germinal epithelium of the ovary and the pelvic peritoneum. Hence, the endometrium and lining of the tubes are considered as modifications of the pelvic peritoneum. Lockyer accordingly believes that, since the pelvic peritoneum and germinal epithelium originate from the same layer, any abnormal hormonal stimulation may initiate a regional differentiation into endometrium. In reviewing the theories that have been advanced, the "serosal theory" comes closest to being correct. It seems to account for all forms of endometriosis, whether in the ovary, pelvic peritoneum, inguinal canal or recto-vaginal septum.

Endometrial growths are governed by the ovaries just as is the normal endometrium. This view is strengthened when we note their histological structure, reaction during pregnancy, and the characteristic cyclic changes occurring in them during menstruation. That there is a continued activity in ectopic endometrium in the presence of functioning ovaries, is a well known fact. It is also known that misplaced endometrial tissues cease to function when ovarian hormonal activity is removed by ablation of the ovaries surgically or otherwise.

It is not my purpose in this short paper to cover the whole field of endometriosis, but to confine myself to endometrioma of the recto-vaginal septum, report a case, and sketch the treatment used in this condition.

From the standpoint of treatment, endometriomata or adenomyomata of the recto-vaginal septum are divided into four main groups.

Isolated, discrete nodules in and freely movable with the vaginal wall are placed in Group I. This type is quite rare.

Group II includes those small tumors in the upper part of the vaginal wall, as a rule posterior to the cervix and occasionally attached to it, but not involving the rectum. In this same group are those tumors found posterolateral to the cervix, extending into the uterosacral or into the base of the broad ligament. Those tumors when about 1 cm. in diameter are usually smooth and globular. When they grow larger they become irregular, due to the formation of new nodules.

Group III takes in those tumors involving the supra-vaginal portion of the cervix, upper portion of the vaginal wall and anterior rectal wall, but which are still confined to the pouch of Douglas. The ureters, lateral walls of the rectum, and uterine adnexæ are not involved. A puckered vaginal or rectal wall, bluish or slate colored, marks the site overlying the tumor nodules. The puckering is due to attachment of the vaginal or rectal walls to the nodule. The picture is that of a blue dome cyst in the breast.

Group IV.—To this group belong those tumors

*Presented before the St. Louis County Medical Society, Duluth, Minn., November 13, 1930.

originating in the recto-vaginal septum, but which spread so as to involve cervix, vagina, rectum, broad ligaments, and may surround and constrict the ureters and mat the pelvic structures into an almost homogeneous mass.

The symptoms and signs vary according to the size of the growths and the viscera involved. Groups I and II rarely produce symptoms and are discovered on routine examination. Tumors in Group III, on the other hand, produce lower abdominal pain, dull or grinding in character, tenesmus, pressure and fullness in the rectum, aggravated by defecation and during the premenstrual period. Occasionally there is bleeding from the rectum, which leads to a diagnosis of hemorrhoids. In the intermenstrual period, since the tumor does not swell, the above symptoms are diminished or absent. Menorrhagia or a prolonged duration of the period is usually present.

In group IV, in addition to the above mentioned symptoms, there is pain and tenderness of the tubes and ovaries. Further, we find the symptoms of hydro-ureter, unilateral or bilateral, as well as pyelitis, where secondary infection has occurred as a result of stasis caused by the constricting growth. These symptoms, as mentioned before, are increased just before and during menstruation, as a result of the ovarian activity on the endometrial tissue.

Treatment is dependent upon the size and location of the tumors as well as the structure involved. Tumors in Group I and those in Group II which are attached to the cervix but do not involve the uterine ligaments are treated by surgical removal through a vaginal incision. Where the dissection is difficult it is better to use radium in order to avoid the formation of a recto-vaginal fistula. For tumors in Group II, involving the uterine ligaments, Cullen advocated extensive dissection. He reported cases in Group III as well, where he resorted to surgery, occasionally resecting rectum, sigmoid and bladder. In a later series of cases Cullen observed a decrease in the size of the tumors involving rectum and bladder where no resection, but only ablation of the ovaries was the treatment. This evidence indicated that absence of the ovarian hormonal activity caused the same atrophic changes in the tumors as it did in normal endometrium.

It is now advised by many authorities that tumors of all groups are best treated by means of radium, X-ray, or a combination of both.

The following case is reported in which radium and X-ray were used successfully:

Mrs. E. W., aged 31, married, consulted me on March 1, 1930, for a shooting pain in her right side present for a week. There was no nausea or vomiting but the patient suspected a return of a pylorospasm (for which she had been treated eight years previous) or an attack of appendicitis.

On questioning, the following history was elicited. The menses started at thirteen, occurred regularly at twenty-eight day intervals but since her marriage were seven days in duration. As long as she could remember she had had pain in her rectum three to four days before each menses. This pain was worse when she was nervous. She was examined on several occasions and advised that she had hemorrhoids. There was no loss of weight, but the patient fatigued easily. While she was not nervous, she was more irritable than usual. The cardiovascular and pulmonary history was negative. She also had had several examinations to determine the cause of her sterility. These examinations were quite complete except that she had not had a Rubin test (likely examined before the test was used).

*Past illnesses.*—The patient had had a curettage and rectal dilatation and had been treated for albumin and casts in the urine, for low blood pressure, and for a pylorospasm.

*Family history.*—Aside from the fact that her mother has Bright's disease, the family history was negative.

*Physical examination.*—The patient was of slight build but well nourished. The head and neck were normal except for slight thyroid enlargement. Heart and lungs were normal. The pulse was 84, temperature 98.2, blood pressure 110/70. There was slight tenderness over McBurney's point but none in the epigastrium. A slight tremor was present in the fingers.

*Pelvic examination.*—The vulva was normal. The introitus admitted two fingers. There was no vaginal discharge, erosion of the cervix, nor laceration present. The uterus was small and freely movable, normal in size, position and shape. The left ovary and adnexa were normal. The right ovary was prolapsed and tender. Just posterior to the cervix a hard, non-sensitive nodular mass the size of a marble was felt in the midline. The mass was bluish in color and appeared to be in the recto-vaginal septum.

*Laboratory examination.*—Urine normal. White blood count 8,700. Red blood count 4,440,000. Hemoglobin 85 per cent. Basal metabolism rate plus 5. A diagnosis of endometrioma of the recto-vaginal septum, prolapsed ovary, and chronic appendicitis was made. The patient was advised to return for observation and a Rubin test.

On April 8, 1930, the patient returned still complaining of pain in the rectum, but now located more in the region of the anus. There were only occasional twinges of pain on the right side. Examination at this time revealed a tumor definitely palpable in the recto-vaginal septum the size of a walnut. There was a small blood cyst on the posterior lip of the cervix. The right ovary was the size of an egg, but not tender.

The right broad ligament was infiltrated and the mobility of the uterus was somewhat limited. Proctoscopic examination revealed a slate colored nodule the size of a hazel nut in the rectum, two inches from the anus, which bled easily when touched with a probe.

The patient was given 826 mgm.-hours of radium in two treatments at an interval of twenty-four hours. The radium was placed in the vagina against the growth and held in place with gauze. Filtration consisted of 2 mm. lead; 1 mm. brass; .5 mm. silver. In addition she received X-ray treatments over the abdomen and lower back.

Following radiation the patient suffered little ill effects save a diarrhea which lasted four days and a drawing sensation in the right inguinal region. Since radiation the patient menstruated twice. Proctoscopic examination revealed no further bleeding or ulceration and the growth had entirely disappeared, leaving only a depression at the original site. On vaginal examination the cervix was clean, there was no discharge or blood cyst present, the uterus was freely movable, normal in size, position and shape. The adnexæ were negative, although both ovaries were prolapsed and small. The growth behind the cervix was white in color and only the size of a pea. Abdominal tenderness was absent and the patient had had no more pains.

Because of several points of similarity to my case I present herewith the salient features of two cases reported by Heineberg.

*Case 1.*—A female, aged 27, had had regular and painless menses since their onset at the age of thirteen. She had had a curettage for uterine discharge. Later she developed pain in the hypogastrium radiating to the iliac region. There was distinct tenderness over McBurney's point. Both ovaries were tender and prolapsed and at operation were found bound down in the pouch of Douglas. The appendix was adherent to the right ovary and was removed. The patient was not relieved of her pain but in addition to the iliac pain suffered a sensation of fullness and pain in the rectum, especially before menstruation. Later examination revealed increase in the size of the left ovary, with thickning of the left utero-sacral ligament. At the second operation both ovaries were again adherent to the pouch of Douglas. The left ovary was the site of multiple cysts and three times the normal size. This was removed. Following operation the patient still had her pain in the rectum. The mass in the utero-sacral ligament became nodular. A diagnosis of adenomyoma was now made and the patient was treated with radium and had no further rectal pain.

*Case 2.*—The main symptoms in this case were pain in the rectum, accentuated before menstruation. Here, too, the appendix was removed because of iliac pain. Physical examination revealed a flattened nodular mass adherent to the posterior vaginal wall, cervix and rectum. The patient had the right tube and ovary removed without relief of her pain. Now, examination showed the tumor to be twice the size. The patient was treated by inserting four needles 12.5 mg. radium in the tumor for twenty-four hours. While she continued to menstruate the growth had decreased in size and her rectal pain disappeared.

## SUMMARY AND CONCLUSIONS

1. The cases presented had many symptoms in common.

2. Rectal pain increased just before menstruation should lead the examiner to suspect endometrioma of the recto-vaginal septum.

3. Radium and X-ray, or a combination of both, is the treatment of choice because of less chance of formation of a recto-vaginal fistula, and the advantage of more complete ablation of ovarian activity.

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# OFFICE TREATMENT OF CHRONIC CERVICITIS*

SUSAN R. OFFUTT, M.D.
*Rochester, Minnesota*

THE chief objectives of treatment of chronic cervicitis are: (1) relief of annoying leukorrhea, (2) removal of a chronic inflammatory lesion which may be precancerous, and (3) elimination of a possible focus of infection.

In treating leukorrhea the etiology must be established. Gonoccocal infection of Skene's and Bartholin's glands may be the source of the discharge, and treatment should be directed against a specific type of infection. The discharge may be due entirely to vaginitis resulting from change in the chemical reaction of the secretion from the cervical glands that secrete mucus, or to the presence of the *Trichomonas vaginalis*. The most common cause of discharge is, of course, cervicitis, which may be primary, or associated with other inflammation.

Chronic cervicitis frequently is characterized by chronic erosion, and this may become later the site of epithelioma. Early carcinoma may be easily mistaken for simple erosion if the eroded area bleeds from contact with a swab on examination or if the velvety character of the surface is lost. Unless biopsy is obtained the diagnosis is not made until considerable valuable time has been lost to the patient.

The cervix must be considered as a possible focus of infection when all foci are being eliminated in the treatment of episcleritis, iritis and arthritis. Also, an infected cervix may be the source of pelvic cellulitis, of low grade, by extension of the infection from the cervix into the lymphatic structures, especially if there is extensive laceration of the cervix.

If the cervix of those women who have borne children is treated in the postpartum period, the entire problem of treatment of chronic cervicitis will be simplified. Whether immediate or later repair is made depends on circumstances. Neglect of postpartum cervicitis may mean later involvement of the upper pelvic structures, which may require major operation. However, most cases seen in the office are not in patients who are in the postpartum period but are of longer standing, due to previous trauma or infection.

Topical applications, such as mercurochrome, iodine, silver nitrate, and phenol, give temporary relief in many cases, but the deeper glands remain infected and the symptoms recur. Diathermy, injection of alcohol and medical ionization also clear up the disease superficially. All these methods give variable results from the patient's as well as from the physician's viewpoint. The infected cervical glands must be destroyed to get the best results, and this may be accomplished by cauterization of the cervix in the office or elsewhere by surgical treatment of the cervix.

If the lacerations are of marked degree, and if the cervix is edematous and angry-looking, it is well to put the patient to bed and to administer hot douches slowly; this results in shrinking of the cervix and may modify the extent of the operation necessary. If operation must be done, it is limited to simple trachelorrhaphy if possible; in more marked cases, a Schroeder or Sturmdorf operation is performed, and in the extreme cases amputation either by the knife or cautery is necessary. However, in the majority of cases the disease is milder, and can be treated in the office by the cautery, with or without anesthesia, depending on the extent of the lacerations and the infection present.

The technic of office cauterization is well established. Except for personal preferences concerning the type of cautery tip, the type of transformer, and the after-care of the patient, the technic is about uniform, and is well described and illustrated by Dickinson. The nasal cautery tip is placed against the area to be treated and the current is turned on. The diseased tissue is covered then by a number of incisions, depending on the depth into the tissue as well as the extent up the canal toward the internal os to which the process has penetrated. The important thing is completely to destroy the infected glands. Few patients complain of pain, and when they do complain of it it is not an unbearable pain; it is not pain in the cervix, but a dull aching across the lower part of the abdomen, similar to a menstrual

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cramp. This sometimes can be lessened by reducing the current. In most cases the necessary cauterization can be done at one sitting. If the patient is unusually nervous and complains of too much pain, or if the cervix can be only poorly exposed, anesthesia is then given. After cauterization the patient is advised to wear a pad and report every other day. I prefer not to use local applications to the cervix or to have the patient use douches, but to allow the sloughing to proceed without interference. The patient is examined every three or four days. The discharge, which at first is increased, usually stops in ten to fourteen days, but complete healing does not occur for about two months, depending on how deeply or extensively the cervix has been cauterized. After the sloughing is over, douches are used, and the cervix may be treated locally twice a week with mercurochrome, until healing is completed.

There are three possible complications in cauterization of the cervix: (1) hemorrhage, (2) stenosis, and (3) pelvic infection. The bleeding seen after cauterization done in the office usually is slight and is due to oozing of the sloughing surface. Moderate bleeding at a given point can be stopped by lightly touching the bleeding point again with the cautery.

I have not seen any alarming hemorrhages from the cervix due to sloughing after cauterization done in the office, but I have seen profuse menstrual bleeding following the procedure when it was done near a menstrual period and precipitated menstruation. When this occurs, the patient is put to bed and is given ergot.

Stenosis rarely occurs after cauterization done in the office. Before the patient is dismissed from observation, the cervical canal is examined with a cotton applicator, and any filmy adhesions that may have formed are broken. Unless the cauterization has been too extensive and has included the internal os, complete stenosis will not occur. In case of stenosis, dilatation of the canal under anesthesia has to be done.

After cauterization of the cervix I have not seen any cases of pelvic infection nor any cases in which latent pelvic infection has been stimulated. Precautions are taken not to cauterize a cervix which is the seat of an acute infection, particularly one due to gonococci, with or without salpingitis. Cauterization is done midway between times of menstrual flow. Occasionally, it is necessary to cauterize the cervix a second time either because all the infected portions were not destroyed at the first cauterization or because reinfection has taken place.

## SUMMARY

In treating leukorrhea, the etiology must be established. If it is due to chronic cervicitis, with or without erosion, superficial treatment will produce only temporary healing in many cases. The best results will be obtained by cauterization of the cervix in mild and moderately severe cases, or by operation in the extensive cases.

# THE NEUROLOGICAL ASPECT OF HEAD INJURIES*

WILLIAM H. HENGSTLER, M.D.
*Saint Paul*

THE subject of head injuries is one of vital importance today to every practicing physician and surgeon. With the vastly increasing accident rate, due to present day motor vehicle traffic, it behooves every medical man to be alert and well-informed in this particular field. Head injuries, in general, have always heretofore been considered as belonging to the realm of general surgery. Actually, however, a comparatively small percentage of them require any real surgical attention. Bruised and lacerated scalps, simple skull fractures without displacement of fragments, basal skull fractures and the like are, of course, fundamentally surgical, but these require so little actual treatment that they may be dismissed, as it were, with a wave of the hand, and no time need be given here to a consideration of them. Compound skull fractures, serious hemorrhage, either intra- or extra-cranial, and fractures with depression of fragments are, of course, real surgical problems and often require operative intervention. In head injuries as a class, however, we are not concerned so much with what happens outside the skull or to the skull itself as we are with what actually happens to the brain and its coverings. For this reason, we herewith adopt as a premise the fact that all head injuries have a neurological aspect and that the greater percentage of them belong primarily in the neurological field of medicine.

In our consideration of what actually happens to the intracranial contents in a head injury, we must remember two vitally important facts:

1. A very bad brain injury may occur without a fracture of the skull.

2. Extensive skull fractures may take place without any actual injury to the brain or its coverings.

The occurrence of either of these two does not necessarily signify the existence of the other.

Let us then try to visualize what may occur, intracranically, in a head injury. Protected as it is, within the skull, by its membranous coverings and the cerebrospinal fluid, the brain is able to withstand, to a remarkable degree, trauma applied to the skull. The effect on the brain must necessarily depend upon the degree of trauma, the method and point of its application and the particular circumstances during and after the accident. The first notable thing that happens is what we term concussion. Various definitions of concussion have been devised such as "molecular disturbance of brain cells resulting in loss of consciousness," etc. Symonds, of London, in the British Medical Journal of November 10, 1928, defines concussion as "a condition of sub-total cessation of cerebral function following immediately upon the injury and lasting only a few moments, with subsequent complete recovery within twenty-four hours." He assumes that unconsciousness or a clouding of consciousness which persists for more than this length of time is not concussion, but is evidence of structural brain injury. We subscribe to the belief that concussion itself may last longer than twenty-four hours, and we designate, arbitrarily, various degrees of concussion, as follows:

1. Slight concussion, in which unconsciousness or clouding of consciousness lasts from a moment up to one hour.

2. Moderate concussion, in which normal consciousness remains absent for a period up to twenty-four hours.

3. Severe concussion, in which consciousness is absent or clouded for a period greater than twenty-four hours.

In any event, we believe that concussion itself does not necessarily imply structural brain or intracranial injury, and likewise that the absence of a true concussion does not eliminate structural injury to the cranial contents. Hemorrhage into the brain itself and into the subarachnoid space, with bruising or contusion and actual laceration of the brain itself, are far more frequent in head injuries than is commonly believed. The delicate structure of the brain, the highly specialized and organized system of blood vessels serving it, and its relationship to the membranes which cover it and to the bony structure which houses it, make it very vulnerable as far as minor injuries to it are concerned.

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If we accept Trotter's explanation of concussion, we may assume that with sudden severe trauma the skull acts as a semi-elastic body and is momentarily compressed, so that its contents are squeezed dry. Unconsciousness and a flaccid paralysis of the body follow, as a result of the sudden cerebral anemia. Recovery of consciousness takes place through a gradual return of physiologic function from the medullary centers progressively upward, so that the whole clinical picture is one of temporary vascular embarrassment. In addition to the above, if the trauma is severe enough or is applied at the proper point, we have a shaking up of the brain and its coverings, with bruising or contusion or lacerations and with hemorrhage of greater or lesser magnitude, with petechial bleeding in the substance of the brain itself, intraventricular hemorrhages or subarachnoid bleeding due to rupture of meningeal vessels. Any such clinical picture as the above results in immediate edema of the brain with increase in intracranial pressure due to fluid increase. Such a condition may result in a markedly prolonged period of lost or clouded consciousness, due solely to increased intracranial pressure instead of true concussion or structural brain injury.

Illustrative of this is the case of B. E., a little girl eight years old, who was seen in consultation with Dr. Albert Ahrens of St. Paul, about two years ago. This child had been knocked down by an automobile and when first seen had been totally unconscious for three or four days and remained very clouded for ten or twelve days more. At the time we first saw her, she lay in a semi-stupor; was unable to swallow, her sensorium was completely obliterated, and although her eyes were open there was absolutely no true consciousness present. She had been fed with a tube all of the time since her injury. A spinal puncture showed a clear fluid under greatly increased pressure. The first drainage resulted in immediate cerebral improvement, and several subsequent spinal drainages cleared her completely in a few days, improvement being noted after each one was done.

A second illustration may be given in the case of a man referred to us from Menomonie, Wisconsin, four or five years ago, who had sustained a severe concussion by being thrown from a railroad train, his head striking the base of a telegraph pole. Although he sustained a concussion, he cleared very shortly and was referred to us some ten or twelve days after the accident, because of headache, vertigo, sluggish mental reflexes and personality changes. Examination showed no focal signs of brain injury, and neurologically there was no evidence of any structural injury to the brain. His eyegrounds, however, showed marked evidence of increased intracranial pressure. Assuming that this man had a wet brain following the accident, he was sent to the hospital and daily spinal drainage was performed for some five or six days, the fluid being clear but under marked increase in pressure. Following each drainage, there was relief, both subjectively and objectively, and at the end of ten days or two weeks he had completely regained his normal personality; his mental reflexes had become normally active, his vertigo and headache had disappeared and his eyegrounds had returned to a normal condition.

In addition to the injuries already enumerated, we often have the exhibition of cranial nerve lesions following head trauma. These may be due to nuclear injury, such as hemorrhage or contusion, or they may be due to injury to the nerves themselves after they leave the base of the brain on their way to the exit from the skull. The latter occur notably in basal skull fractures and in severe subarachnoid hemorrhage, particularly at the base. These cranial nerve lesions are valuable from the standpoint of diagnosis and localization, and are temporary or permanent, according to the location and degree of the injury. It must be remembered that hemorrhage by "countre coup" is a frequent and often undiagnosed factor in head injuries. In attempting localization, this possbiility should ever be borne in mind.

Passing on, we will undertake to consider, from the angle of the neurologist, the immediate treatment of the head injury, assuming that no operative condition exists, and confining our observations to the intracranial condition. If concussion exists, with a rapid return of normal consciousness, and no signs of focal injury or intracranial hemorrhage, no particular treatment is indicated other than absolute rest for a day or two, with relief of subjective symptoms as they may arise. If unconsciousness or a clouding of consciousness persists, a careful and complete neurological examination is indicated, with very close observation of the patient's condition from one hour to

another. The examination is directed toward localization of any intracranial injury and toward the condition of intracranial pressure. To these ends particular attention is paid to cranial nerves and to reflexes in the extremities, to the eyegrounds, the pulse, the temperature, the respiration and the blood-pressure. Careful note is also made of the condition of the individual's sensorium. We believe spinal puncture to be valuable from the standpoint of diagnosis as well as treatment, and we use it unhesitatingly and have never seen it do any harm. The occurrence of bloody spinal fluid proves conclusively subarachnoid or intraventricular hemorrhage, assuming, of course, that the fluid is uniformly bloody and not merely blood-tinged in the first few drops where the needle strikes a vessel in the operation of puncture. Likewise, subsequent punctures reveal the condition of the hemorrhage—a gradual daily fading in the coloring of the fluid showing that the hemorrhage has ceased.

From a therapeutic point of view, drainage of the canal reduces the fluid intracranial content and relieves increased intracranial pressure and frequently promotes rapid clearing of consciousness. It has been our observation that this is particularly true in those cases as cited above, where consciousness has partly returned but is cloudy and in which there is no paralysis or other evidence of focal brain injury. We have several times seen a marked benefit rendered to paralyzed cranial nerves by repeated spinal drainages. Repetition of the drainage is made in direct accord with the degree of increased pressure of the fluid which is observed. It is frequently repeated every twelve hours; in other instances every twenty-four to forty-eight hours, as the individual case seems to warrant. There is no definite rule as to frequency of drainage or amount of fluid withdrawn. Each case determines its own status in these respects. We believe in spinal drainage in proper cases; we advocate it and we prefer it to the use of saline or magnesium sulphate.

Miss M. R., a patient seen with Dr. Carles N. Hensel, of St. Paul, in the winter of 1928-1929, is an example of the large number of cases in which spinal drainage has shown itself to be definitely valuable. Knocked down by an automobile and sustaining an apparent slight concussion, with laceration of her scalp, she was taken home, walked into her house and up two flights of stairs to her bedroom, and a short time later collapsed again unconscious. We saw her about two and one-half hours after the injury was sustained. Her consciousness was very clouded. She had a marked sensory aphasia and was in very poor condition generally. Diagnostic spinal puncture showed bloody spinal fluid, under markedly increased pressure. A full drainage was done and repeated at twelve hour intervals several times, with marked improvement after each drainage. This patient subsequently recovered, uneventfully, except that she has permanent loss of sense of taste and sense of smell. The aphasia did not persist. In this particular case, the bloody spinal fluid did not clear at once, several successive punctures indicating the presence of fresh blood. This fact, together with the marked increase in pressure shown at each puncture, is, to our mind, evidence that the constant intracranial bleeding would probably have killed this patient had not the pressure been relieved at intervals by spinal drainage. It has been our observation that there is a better prognosis in severe head injuries which present a bloody spinal fluid under greatly increased pressure than in those where the fluid is clear and under normal or reduced pressure.

Careful observation during the first thirty-six or forty-eight hours after injury often permits the early diagnosis of concealed or delayed intracranial hemorrhage, with focal symptoms such as paralysis of one kind or another or a second gradual loss of consciousness. It is in this class of cases where operative intervention is often most valuable.

A patient seen with Dr. L. E. Daugherty, in St. Paul, in the winter of 1929, had been injured by a collision between his car and a railway train. He was taken unconscious to a hospital, regained consciousness shortly, and seemed to be all right in every way. Within a few hours, however, he began to notice motor disturbance in one of his lower limbs, which gradually progressed to a complete paralysis, with reflex changes of the upper motor neuron type, and with a clouding of the sensorium which finally reached total unconsciousness. Operative intervention was advised following localization of the hemorrhage and a decompression, performed by Dr. Harry P. Ritchie, disclosed a subdural clot of considerable size, which was removed, and the patient recovered fully.

Most important and often most difficult is the task of determining permanency in head injuries

and of deciding which of the existing sequelæ will never be relieved. No hard and fast rule can be applied in making such tests. Each case must be studied as an individual problem and classified accordingly. There are, however, certain definite after-effects which are commonly found in head injuries and which can be looked for quite uniformly in all cases. The remote effects of these injuries are most important from the industrial and medico-legal angle, and it is well to give them a prominent place in this discussion. To begin with, we must classify these symptoms very positively into subjective and objective. Among those predominating in the subjective group are the following:

1. Headache
2. Vertigo
3. Nausea
4. Inability to concentrate normally
5. Failure of memory
6. Emotional disorders, such as depression, fear and anxiety
7. Premature fatigability.

Among those prominent in the objective group are:

1. Paralyses of various kinds
2. Vomiting
3. Reflex changes
4. Inability to sleep
5. Marked loss in weight
6. Crying spells
7. Spells of intense emotional disorder
8. Aphasia or amnesia.

Without attempting to treat each of these singly, but grouping them for consideration, it can be stated first that the average case of head injury presents far more subjective than objective symptoms from the standpoint of sequelæ. One naturally expects, after a head injury of sufficient magnitude to produce concussion, that there will be for a time an exhibition of many or all of these after-effects. As to just how long they will last, however, is a matter of opinion, based largely on experience and circumstances surrounding the individual case.

Of the subjective sequelæ enumerated above, the most persistent are headache, inability to concentrate normally, and premature fatigability. Under ordinary conditions, it will be conceded that six months is sufficient time to heal a simple skull fracture without depression of fragments, no matter where this is situated. The various subjective symptoms usually disappear, in irregular fashion, in from three months to one year after the injury, depending upon their severity. The resistance of the individual and the speed with which litigation and questions of compensation and damages are settled are very important factors in determining the length of time required for such symptoms to disappear. The last is of paramount importance. Regardless of how the settlement is made or of how favorable or unfavorable to the injured person it may be, the fact that the case is settled and out of the way is always beneficial and expedites recovery. The facing of a law-suit, with the inevitable anxiety attendant to it, and the necessity of keeping all facts in mind to recite to the jury, is a great obstacle to recovery.

As to the objective symptoms, it may be stated briefly that those symptoms which persist for more than one year will probably be permanent. It is surprising how many abnormal reflexes will adjust themselves to normal in the course of twelve months after an injury and how many objective signs and symptoms will disappear during that length of time. Here again, of course, the individual case must be taken into consideration, but, in general, permanency is reached after a year has elapsed, and those sequelæ persisting that length of time may be considered as permanent. Again, in the consideration of sequelæ, particularly those in the subjective group, the age of the individual is most important as far as prognosis is concerned. We have had under our observation, at intervals, a detective who was slugged in a jewel robbery a few years ago, having been knocked out by a black-jack in the hands of the highwayman, and sustaining thereby a stellate fracture of the outer table of the skull, in the parietal region. He was unconscious only a few moments and there were no focal signs and no intracranial complications. Neurological examinations have been repeatedly negative, and nothing objective has ever been found, yet he has never been able to work a day at his regular profession with the Pinkerton Agency since he was hurt. Sixty-two years old when injured, he has never been able to regain his normal power of concentration at his work, cannot follow instructions accurately and cannot make out ordinary reports. In addition, he is depressed and somewhat upset emotionally. Were he twenty or thirty years younger, he probably would have

recovered long ago. As it is, he will doubtless never work again at his regular employment.

Conversely, a young man of twenty-seven, recently seen, who sustained a very severe head injury in the crash of the Northwest Airways plane last year, receiving a severe concussion with multiple skull fractures, and an evidently profound cerebral disturbance, will probably recover his normal efficiency and be able to go on with his regular work. He presents the same clinical picture, subjectively, as the first mentioned case, but has the advantage of being young and in the constructive period of life. Thus it is seen that a multiplicity of factors must govern the permanency of after-effects in head injuries, but in a general way it may be reiterated that the majority of those who recover fully do so in one year's time.

Statistically, it is difficult to state positively what percentage of head injuries becomes permanently disabled or recover fully. An analysis of seventy-one cases, by Symonds, in which he had secured accurate data at periods remote from the accident, shows 10 per cent totally disabled, 43.5 per cent able to return to light work, and 46.5 per cent able to return to full work. These seventy-one patients were individuals who had sustained definite cerebral disturbance following head injury.

One cannot leave this subject without a word in comment upon mental deterioration and epilepsy, as sequelæ of head injuries. As far as the former is concerned, we believe that genuine mental impairment following head injury is comparatively infrequent. So-called mental deterioration or feeble-mindedness in children, which for purposes of litigation is frequently attributed to some head injury sustained early in life, usually turns out to be ordinary congenital mental deficiency. Permanent mental impairment or deterioration to the extent of requiring institutional care is certainly rare.

Epilepsy as a sequel of head injury is often a matter of dispute in the court room and a matter of difference in opinion among medical men. Briefly, it may be said that the only kind of epilepsy which follows head injuries is the Jacksonian type. This is always due to focal brain injury or irritation. Epileptic spells may occur in the early stages of a head injury and are probably due to hemorrhage into the subarachnoid space, and do not always mean a permanent likelihood of attacks. Jacksonian epilepsies, developing after a period of many months or years after the injury, are much more serious. Essential epilepsy, in any form, is never caused by head injury, and as a rule if the Jacksonian type of spells are going to occur, they usually make their appearance within a reasonable period of time after the injury, probably within six months. If they appear at an interval more remote than that, they are usually due to cyst formation, abscess or some degenerative lesion, which takes time to develop.

The subject of head and brain injuries is one of profound interest and importance. As stated in our opening paragraph, we believe it to be largely neurological. Certainly, it is deserving of the consideration of every member of the medical profession.

1068 Lowry Medical Arts Building.

# TREATMENT OF SECONDARY DEFORMITY IN CASES OF HARELIP*

GORDON B. NEW, M.D., AND FREDERICK A. FIGI, M.D.
*Rochester, Minnesota*

AT THE present time, the results from operations on harelips by those experienced in this type of work are excellent in a large percentage of cases. There are, however, a certain number of cases in which operations have been performed by inexperienced surgeons, and secondary deformities have resulted which require correction (Fig. 1*a* and *b*). Such deformities may not be the result of the operation but may be due to the fact that the child was in poor physical condition at the time of the operation or that the wound became infected. In these cases a careful general examination should be made, and, if necessary, the patients should be observed carefully until their condition is such that operation is advisable. As a rule, the results from operation for harelip are much better during the spring, summer and autumn than during the winter, on account of the tendency to upper respiratory infections with running of the nose. We operate in winter only on children who cannot be brought to us at any other time. The use of silkworm-tension sutures to hold the ala in position and of a Logan clamp to relieve the tension on the suture line are both invaluable aids in preventing secondary deformity, regardless of the method employed.

The deformity may be of a minor nature, such as slight flaring of the nostril, or notching or irregularity of the vermillion margin, but such deformities detract from an otherwise good result and are noticeable. At times one sees such deformity as slight flattening of the upper lip due to approximation of the alveolar process by wires, or the more marked deformity due to the loss of the greater portion of the upper jaw from a disastrous attempt forcibly to approximate the jaw. The marked flattening of the upper lip resulting from the removal of the premaxilla is a common deformity. Secondary deformity presents greater problems in correction than the original condition on account of the loss of tissue and the scarring (Fig. 2*a* and *b*).

The aim of the surgeon when he accepts for operation a patient with a single harelip should be to make the nose and lip so shaped that the average person would not know that a deformity had existed. To accomplish this ideal means that many secondary operations must be performed, some of which, however, may be of a minor nature.

A common postoperative deformity in cases of single harelip is the displacement of the median line of the nose to one side with rotation of the tip of the nose and flaring of the nostril. There is also frequently notching or irregularity of the vermillion margin. In such cases the long axis of the oval-shaped vestibule of the nose on the harelip side is usually directed laterally instead of anteroposteriorly. This deformity is usually the result of incomplete freeing of both cheeks and nose at the time of the operation, and not rotating the tissue below the ala of the nose into the nostril to form the floor, as Blair has shown. It is well to make a nostril a little smaller and the outer extremity of the ala a little higher than the opposite side at the time of the operation, as there is always a tendency for the spring of the cartilage to cause the ala to displace outward and downward (Fig. 3*a* and *b*).

The correction of this deformity usually requires thorough freeing of the lips, cheeks and cartilage of the nose, and possibly refracturing of the nasal bones to bring the nose to the median line and fix it in this position with sutures or splints. To change the oval-shaped opening of the vestibule of the nose so that the long axis is anteroposteriorly instead of laterally a triangular wedge of cartilage is excised from the anterior part of the columella below the tip of the nose, and, by rotating the cartilage forward and inward, correcting this deformity. Fixing the cartilage and ala in its new position by means of silk sutures and silkworm-tension sutures is essential. The ends of the silkworm sutures are fixed by lead buttons and shot. In order to allow the flared ala to be brought into its correct position without folding, it is sometimes necessary to free

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the skin and mucous membrane from the cartilage so that the cartilage will slide between the skin and the mucous membrane, or to crosshatch the cartilage at certain points to eliminate the nasal bone in order to correct the rounding of the bridge.

The lip in most of these cases of postoperative deformity has to be lengthened or shortened, and

Fig. 1. *a*, Flared nostril with notching and irregularity of the vermillion margin; *b*, deformity corrected by rotating inward the ala with the area of skin below it to form the floor of the nose; excision of the scar and realignment of the vermillion margin.

Fig. 2. *a*, Displacement of the median line of the nose to the right, with flared nostril, rolling of the margin of the ala and notching of the vermillion margin; *b*, the position of the nose in the median line; the deformity of the ala and vermillion margin has been corrected; the flattening of the left side of the nose has been corrected by means of a cartilage implant.

curve. In this type of deformity it may be necessary to remove a piece of the cartilage from the margin of the ala and the tip of the nose, as this is usually lower than the remainder of the nose, due to its rotation (Fig. 4*a* and *b*).

Even after correction of the remainder of the deformity, as outlined, there still may remain a flattening of the side of the nose, the result of lowering and rotation of the tip. Although it has been suggested that this alar cartilage, which is usually concave externally, may be removed and replaced with its convex surface outward, we feel that the insertion of cartilage, either from the back of the ear or from the rib so that it just fills this flattened area, producing fullness comparable to that on the opposite side, is preferable.

In the cases in which deformity of the nose is associated with double harelip there is usually more marked deformity than in the cases of single harelip (Fig. 5*a* and *b*). Rounding of the bridge and tip of the nose, flattening of the anterior part of the vestibules, and shortening of the columella are characteristic. If the patient is a child this is best corrected by advancing the skin over the nose and lengthening the columella; if an adult, the cartilage in the region of the tip should be readjusted to stand forward as a tip. It may be necessary to remove a part of the

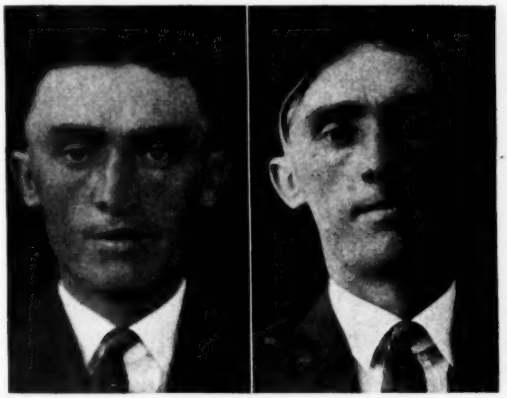

Fig. 3. *a*, The median line of the nose is displaced laterally; the lip is short and the vermillion margin is drawn up; *b*, the nose has been placed in the median line, the deformity of the lip and ala corrected, and the vermillion margin realigned.

the drawing up of the vermillion margin with notching corrected. The lip may be lengthened by making concave incisions, removing the scar down to a point laterally on the vermillion margin and then reapproximating the lip. In cases of double harelip the usual deformity of the lip is too much length from the columella to the vermillion border, and it may be necessary to remove a part of the tissue to correct the deformity. The vermillion margin may have to be

rolled out on both sides and sometimes reconstruction of an entire new vermillion margin is necessary because of rolling out of the mucous membrane from the inside of the upper lip. If the nose and lip are scarred down to the jaw and the alveolar process, the use of Thiersch grafts on dental compound after excising this scar may be necessary to raise the nose and the lip. In older children and adults a dental plate may be used to fill in this newly formed pocket and to hold the nose and lip forward.

The upper lip may be short laterally, due to loss of skin and mucous membrane from repeated operations. In this type of deformity a wedge-shaped portion of the full-thickness of the center of the lower lip is turned up on a lateral pedicle. The flap from the lower lip is sutured in the median line of the upper lip after excision of the scarring. It is necessary to feed the patient for about two weeks by means of a tube or catheter until the pedicle may be cut across and the suturing completed. This makes a satisfactory replacement of the skin and vermillion margin of the center of the upper lip. The deformity due to loss of the premaxilla and anterior part of the upper jaw is best corrected by means of dental appliances which hold the lip forward (Fig. 6*a* and *b*).

The correction of these secondary deformities usually requires much patience and ingenuity and sometimes multiple operations. Whether the deformity is small or great, it behooves the surgeon to do everything possible to correct it.

Fig. 4. *a*, Typical lateral view of patient with flattening of the upper lip, the result of forceful approximation of the alveolar process; the cartilage at the tip is lowered from the rotation of the nose; *b*, correction of the deformity, removal of the cartilage and insertion of a dental plate to hold the upper lip in correct position.

Fig. 5. *a*, Deformity resulting from double harelip; the rounding of the bridge and tip of the nose, with a short columella and upper lip, and the flattening of the upper lip may be seen; *b*, the lip has been lengthened, the cartilage of the tip of the nose has been readjusted so that a tip has been made, the hump has been removed and the columella lengthened; further removal of an elliptical piece, and rolling the lower lip inward would further correct the deformity.

Fig. 6. *a*, Double harelip with loss of the premaxilla and part of the upper jaw; the upper lip is flattened and shortened; *b*, the loss of tissue in the upper lip has been replaced by turning up on a lateral pedicle a wedge-shaped piece from the center of the lower lip; rounding of the bridge of the nose should further be corrected.

# CARDIAC EMERGENCIES*

JOHN M. LAJOIE, M.B. (TOR.), M.D.
*Minneapolis*

IN AN organization like this Clinical Club, where each member is limiting his work to some special domain in medicine, all do not have the time or opportunity to become familiar with the various cardiac emergencies that may arise. I thought it would be of interest to review these alarming conditions. It has been a great help to me at times to quickly consider in tabloid form the various types of cardiac emergencies while getting ready to do something when face to face with a more or less alarming emergency.

First of all it is well to remember that symptoms of sudden onset referable to the heart are not necessarily associated with structural disease of that organ. I have in mind a woman I had in the hospital under treatment for a cardiac condition. She was very nervous and suddenly developed a sinking sensation in the region of the heart. She thought she was dying and sent for me and her family. When I arrived she was lying flat in bed with her eyes fixed and looking beyond the ceiling, her family were about her and everything suggested the approach of death. The skin was warm, the breathing was quiet and shallow, the pulse and blood pressure were normal and the heart showed no change. After I succeeded in assuring the family and the patient that death was not hovering about they all had a little laugh about the affair and the family went home.

In functional heart conditions the circulatory failure is not associated with any constant change in cardiac morphology. We are afforded help by the changes that occur in the circulation in parts of the body other than the heart. These changes help us to recognize the functional basis.

The exact nature of the changes in the dynamics of the heart which underlie the signs and symptoms of heart failure are as yet not clearly understood.

In a general way heart failure may be divided into two kinds: one in which the left side gives away functionally, and the other in which the signs and symptoms indicate that the right heart is affected. Failure of the auricles does not produce alarming symptoms, and there are many persons going about in apparently good health with their auricles functioning poorly.

The important symptoms present in left heart failure are: cough, usually worse at night, Cheyne-Stokes breathing, attacks of cardiac asthma and acute edema of the lungs. The physical signs that may be present are râles in the base of the lungs and difficult breathing. There are signs also of the underlying cause of the left heart failure, as hypertension and chronic nephritis, arteriosclerosis and luetic aortitis.

Very much different are the signs presented in right heart failure. They are cyanosis, pain and tenderness in the region of the liver, an enlarged congested liver, edema and effusion of the serous sacs, and scanty urine.

As an example of left heart failure may I call to your attention a patient I have under management for decompensation at the present time (C. E. T.). The patient has an aortic insufficiency due to lues, with the valves involved at their commissures near their attachment to the aortic wall. When there is evidence of aortic insufficiency one should always suspect syphilis. I will go further and say that if a person of middle age becomes decompensated for no apparent reason we must suspect syphilis.

As an example of right heart failure I will cite the case of a woman (Mrs. N. C.) who when first seen had a chronic heart condition, marked edema, cyanosis, ascites, large tender liver and scanty urine. Prompt paracentesis was indicated and done and followed by the usual cardiac management. The heart improved, the large liver became smaller, the urine increased but the ascites persisted, requiring paracentesis some ninety times. The tenderness and pain in the region of the liver was due to the acute stretching of the liver capsule, and is a very important early sign of failure of the right ventricle. Tenderness in the epigastrium and right hypochondrium may occur even before the liver is large enough to be

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palpable. Later, as the liver becomes chronically enlarged, the pain subsides and the liver becomes filled with connective tissue.

Scanty urine is of more importance than albuminuria in indicating passive congestion of the kidneys. The edema that occurs in right heart failure tends to gravitate to dependent parts and it may disappear, but ascites and pleural effusion persist.

In auricular fibrillation the high auricular rate is the cause of the sudden circulatory embarrassment. In this condition the urgent need is to remove the load by slowing the ventricular rate. This is best accomplished by giving large doses of digitalis. A hypodermic of morphia helps to put the patient at ease and give much needed rest. It is a life-saver when the patient is so distressed he cannot remain in bed. I saw such a patient (Mr. P. D.) in consultation last year. He had auricular fibrillation and was so badly decompensated that he could not stay in bed. He had been in a chair for four days. Morphia for forty-eight hours made him comfortable in bed and with sufficient digitalis he improved so rapidly that he was symptom-free in a short time and has been about and apparently well ever since.

Besides proper medication, absolute rest, a simple light diet, restricted fluids and active purgation are indicated. Digitalis is of doubtful value in urgent cases of congestive failure with increased rate if the rhythm is normal. If done very early, venesection of ten or fifteen ounces of blood helps by lowering the pressure. If there is no digitalis in the system an intravenous injection of strophanthin gr. 1/250 in 40 c.c. of normal saline may be of benefit.

Auricular flutter illustrates a condition where the amount of blood put out by the heart has been shown experimentally to be diminished. In this condition the blood pressure is low, there is cyanosis and weakness. Since this is a shock type of failure, digitalis perhaps does more harm than good. It should be remembered, however, that digitalis is sometimes used in auricular flutter to change the rhythm responsible for the failure and not to treat the failure itself.

Mitral stenosis is a type of heart failure which has for its chief characteristics the inability of the heart to increase its output sufficiently to meet the ordinary demands of the body. The essential treatment is to limit the activity of the individual. Digitalis is of benefit if not depended on too much. It slows a fast heart, allowing the left ventricle to fill more completely during diastole and its stimulation of the left ventricle aids the peripheral circulation.

The advanced hypertensive heart is a type of heart failure which shows no evidence of any diminution of the cardiac output. The chief symptom is dyspnea occurring at night or after exertion. The blood pressure is high, the pulse full, the color is good and the extremities are warm. The symptoms do not suggest shock. In a hypertensive heart the ability of the right and left chambers to adjust their work to rapidly changing demands may be diminished so that the right and left ventricle do not coöperate well. When a call for increased work comes to such a heart the left ventricle is unable to respond. The right ventricle being able to respond increases its output so that a temporary congestion of the lungs follows this response, resulting in an attack of dyspnea. A hypodermic of morphia quiets the patient and perhaps reduces the cardiac output allowing normal coöperation between the right and left ventricle. Atropine should not be used as it increases the heart rate. Digitalis, if used, may diminish the frequency of attacks.

This brings us to acute edema of the lungs. The coughing of blood-stained serous fluid is indicative of very serious trouble in the pulmonary circulation. At the onset a small dose of morphia and 1/100 of atropine should be given. If there has been delay in giving the morphia and atropine, venesection of from fifteen to twenty ounces of blood is the only treatment likely to benefit the patient. When acute pulmonary edema is not due to cardiac insufficiency or to a pneumococcus or a streptococcus infection it may be due to localized angioneurotic edema or to some local vasomotor disturbance.

There is a paroxysmal dyspnea of cardio-renal patients that has the habit of occurring at night and is very alarming. If signs of respiratory infection are present, such as a bronchitis, the use of bronchial sedatives with inhalations will be very welcome to the patient. But if the patient is having Cheyne-Stokes type of breathing and shows no greater distress while lying flat than when propped up with pillows the breathlessness is due most likely to an acidosis due to the retention of renal insufficiency. Here again morphia will give immediate relief. A course

of diuretin and three or four weeks in bed is the treatment to be carried out.

Another very alarming condition is one due to an embolism. When an embolism plugs a vessel carrying blood to the lung or one supplying the brain the symptoms produced are the result of the changes of the vascular supply to the infarcted area. When a clot is detached from the right auricular wall of a fibrillating heart it may lodge in the pulmonary vessel and cause dyspnea, hemoptysis, pleuritic pain and later pleural effusion, but, if the mural thrombus is from the left auricle the signs will be those of cerebral embolism or the occlusion of some other artery. Morphia should be used to relieve the distress and to insure complete rest. If pleuritic pain develops the affected side should be strapped with adhesive.

Cardiac syncope.—This is a sudden attack of unconsciousness which may be terminal, in which case treatment would be of no avail. Cardiac syncope may occur in persons who are apparently in good health. It may be caused by a plugged pulmonary artery, the occlusion of a coronary artery, or a ruptured ventricle or aortic aneurism.

There is a much larger group of cardiac patients who have less serious symptoms. In this group the syncopal attack is due to a sudden disturbance of the normal cardiac mechanism which results in a diminished cardiac output and low blood pressure which in turn causes a lessened supply of blood to the brain. These attacks are believed to have their origin in some disturbance of the vagus nerve and recovery is spontaneous when the vagus releases its control of the sino-auricular node. In this condition atropine in large doses is useful.

Another cause for a syncopal attack is the onset of complete heart block. Among the causes of heart block may be mentioned arteriosclerosis, syphilis, rheumatism and the improper administration of digitalis. The underlying condition should be sought and, when found, its proper treatment should be undertaken. It is well to remember that patients do not die from the conditions peculiar to heart block; they die from heart failure. The conduction changes resulting in heart block are sometimes produced by the vagus and a long interval of freedom from attacks may be obtained by the use of atropine. When there is complete auriculo-ventricular dissociation the syncopal attack may be controlled by intramuscular injections of adrenalin hydrochloride, which increases the rate and strengthens the contractions of the ventricle. Barium chloride, 30 mg. four times daily, has been used. It acts by increasing the irritability of the auricular ventricular bundle, and by raising the ventricular rate prevents standstill. I am not very enthusiastic about its use.

Digitalis may convert an incomplete block into a complete block, and therefore should not be used. But if a complete block exists, digitalis may be helpful. The presence of a Stokes-Adams syndrome is the only contraindication to the use of digitalis in complete heart block.

I wish to mention some other conditions in which syncope occurs as the result of diminished cardiac output and low blood pressure. I refer to paroxysmal tachycardia with a heart rate from 160 to 180 beats per minute and to auricular flutter where the auricular rate varies from 200 to 350 beats per minute. When the rate is so fast, the associated fall in blood pressure causes a diminished supply of blood to the brain and syncope. When the greatly increased rate is due to paroxysmal tachycardia, gradually increasing pressure on the right vagus nerve as it courses along the carotid sheath is effective in aborting many attacks. If the attack is of ventricular origin digitalis may help. I have seen quinidine used with apparent success. Auricular flutter, which is rare, may be the cause of the increased rate. It differs from true paroxysmal tachycardia in that the increased rate is practically always associated with failure of conductivity; *i.e.*, it is a two to one heart block. A persistent ventricular rate above 120 in elderly persons presupposes auricular flutter. Full doses of digitalis are used to change auricular flutter into auricular fibrillation and finally into a normal rhythm.

A very alarming emergency that happens too often in the operating room is that of cardiac arrest. It is unsuspected and unforeseen. Cardiac arrest in the operating room is either primarily cardiac or secondary to vasomotor relaxation. Cardiac failure secondary to vasomotor relaxation may be suspected by frequent blood pressure readings during anesthesia. By intravenous injections of fluid the pressure may be maintained and cardiac arrest prevented. If cardiac arrest has occurred one must work quickly and restore cardiac rhythm before six minutes has elapsed. The success of treatment usually depends on the

operating room staff being ready for the emergency. First give a solution of 1-50,000 adrenalin in normal saline into the left common carotid artery. Give about 200 c.c. If this fails an osteoplastic flap made through the chest wall will allow the operator to do cardiac massage, which is successful in about 25 per cent of the cases. It is well to remember that cardiac stimulants are rarely successful if the circulation has ceased.

Both types of cardiac arrest are probably associated with ventricular fibrillation.

Of all the causes of cardiac syncope none compare in seriousness with that of fibrillation of the ventricle. It is a terminal event and there is nothing we can do to help the patient. It is the cause of death in early chloroform anesthesia. It may terminate a Stokes-Adams syndrome. It occurs in persons taking digitalis or quinidine, and it may occur in apparently healthy persons. This emergency may never arise if we keep it in mind and are careful. Digitalis should be discontinued in treating auricular fibrillation if there is a slow bigeminal pulse. Strophanthus should not be given intravenously in larger doses than gr. 1/250 in a twenty-four hour period and should not be given at all if there is digitalis in the patient's system. Quinidine should be reserved for selected cases which are at rest in bed and under careful observation.

There are some other forms of shock having cardiac signs or symptoms. They are the heart failures that occur in acute infections and those associated with pregnancy. Since they are not associated with any definite pathological condition and are not primary heart conditions nothing more will be said about them.

In conclusion, since we now have on our finger tips the various forms of cardiac emergencies, there will be times when there may be some doubt in our minds as to the correct diagnosis and the best remedy to employ. While making a mental study of the presenting symptoms we can be of help if we keep in mind two important factors: namely, to establish self-control and confidence in the patient, and to bring about spontaneous relaxation following exhaustion. To quiet the nervous system and relax the spasm nothing is so helpful as a hypodermic of morphia and atropine. The atropine is used to prevent depression. Have the patient recline on some pillows. For quick momentary action smelling salts serves a purpose, or a tablespoonful of whisky in twice the amount of hot water. Hot coffee by mouth, if the patient can take it, is excellent, and may also allow the belching of gas. If collapse, dyspnea, low blood pressure or cyanosis is present, ergot may be injected into the muscle with good results.

In closing may I say a few words about digitalis, our best heart remedy? It was first brought to the attention of the medical profession by Withering in 1785. Its best therapeutic effect is obtained by using the standardized tincture which combines all the qualities of the various isolated principles. When digitalis is employed in therapeutic dosage where there is a disturbed cardiac mechanism it produces decreased conductivity of the auricular ventricular node, causing a slower pulse, and it increases the force of the ventricular contraction. In other words it lengthens and strengthens cardiac systole, causes an increase in pulse force and raises arterial pressure.

No definite limit can be placed on the amount of digitalis necessary to produce and maintain a desired physiologic result. When the drug is given in large doses it is essential that the patient be carefully watched and that it be discontinued on the appearance of symptoms of physiologic intolerance concerning which Withering said, "Let the medicine be continued until it either acts on the kidneys, the stomach, the pulse or the bowels; let it be stopped upon the first appearance of any one of these effects."

612 Medical Arts Building.

# DIFFERENTIAL DIAGNOSIS OF ENDOCARDITIS*

HARRY L. SMITH, M.D.
*Rochester, Minnesota*

THE clinical types of endocarditis may be subdivided as follows: (1) acute bacterial endocarditis, (2) subacute bacterial endocarditis, and (3) rheumatic endocarditis: acute rheumatic endocarditis, recurring rheumatic endocarditis, and chronic rheumatic endocarditis.

In the majority of cases, when a diagnosis of endocarditis is established, the particular type is not difficult to determine. This is especially true of the typical cases (Table 1); in the atypical cases considerable difficulty is encountered at times in differentiating the types.

Subacute bacterial and acute and recurring rheumatic endocarditis are the types that are likely to be confused, and they cause the most difficulty in diagnosis. Occasionally, a fulminating type of subacute bacterial endocarditis will closely resemble acute bacterial endocarditis. This paper will not include a consideration of chronic rheumatic endocarditis.

## ACUTE BACTERIAL ENDOCARDITIS

This condition was known to older writers as endocarditis lenta, and as malignant, ulcerative, septic, or septic bacterial endocarditis. Clinically, acute bacterial endocarditis is not as important from a cardiac standpoint as the other two main groups.

Staphylococci and streptococci, *Neisseria gonorrhea* and *Diplococcus pneumoniæ* are the organisms most frequently responsible for the disease. Cases have been reported that were due to *Eberthella typhi* (typhoid bacilli), *Mycobacterium tuberculosis, Bacillus anthracis, Corynebacterium diphtheriæ, Neisseria intracellularis* (meningococci), and *Escherichia coli* (colon bacilli).

There is a greater variance of opinion concerning the incidence, symptoms and mortality of gonorrheal endocarditis than concerning the other types of acute bacterial endocarditis. Gonorrhea is not a common cause of heart disease, as is illustrated by the fact that Cabot failed to find a single case with this etiology in 1906 postmortem examinations in cases of cardiac disease. It is often stated that gonorrheal endocarditis is less acute and not as malignant as are the other types of acute bacterial endocarditis, but in the proved cases it would appear that gonorrheal endocarditis is about as fatal as are the other forms of acute bacterial endocarditis.[10] Gonorrheal endocarditis is a direct result of gonorrheal septicemia, just as the other types of acute bacterial endocarditis are results of general septicemia or bacteriemia. Acute bacterial endocarditis, compared to the other types of endocarditis, is relatively rare.

Vegetations are practically always present in acute bacterial endocarditis, and usually there is loss of substance of the valves, in varying degrees, that frequently leads to perforation of a leaflet. The deeper structures commonly share in the process. The mitral valve is the one that is most commonly involved. Involvement of the aortic valve occurs next in frequency, and invasion of both aortic and mitral valves occurs with less frequency. The tricuspid valve alone is rarely affected.[9,11]

It is difficult to reconstruct a satisfactory clinical picture of acute bacterial endocarditis. Previously injured valves are more likely to be involved than normal valves. The objective cardiac evidence may be that of healed rheumatic endocarditis. In the majority of cases the cardiac symptoms are only a part of the picture of generalized infection, and evidence that the heart is involved often is masked by the patient's critical general condition. Embolism is a frequent complication, and this often is the first positive proof of the cardiac involvement. The usual clinical picture in this group of cases is that of severe septicemia or bacteriemia. As a rule these cases run a course varying in length from a few days to a few weeks, and are practically always fatal.

As has been stated in the foregoing, subacute bacterial endocarditis, and acute and recurring rheumatic endocarditis, are the types that are most difficult to differentiate and they are the cases that merit special consideration.

*From the Section on Cardiology, The Mayo Clinic, Rochester, Minnesota. Submitted for publication January 21, 1931.

Table 1

DIFFERENTIAL DIAGNOSIS OF (ACUTE AND RECURRING) RHEUMATIC ENDOCARDITIS AND SUBACUTE BACTERIAL ENDOCARDITIS

| | Subacute bacterial endocarditis | Rheumatic endocarditis (acute and recurring) |
|---|---|---|
| Etiology | *Streptococcus mitior* (viridans) | Rheumatic fever, chorea, tonsillitis (streptococci) |
| Incidence | 0.5 to 1 per cent of all cardiac diseases | 18 to 20 per cent of cardiac diseases (including chronic) |
| Sex | About equal numbers of males and females | More common in females |
| Age | Occurs in older group 5-10 years | Begins usually with patients less than 30 years of age |
| Leukopenia | May occur | Rare |
| Leukocytosis | Rare, unless sepsis present | About 50 per cent of cases |
| Anemia | Slight in the early stage; later, usually marked and progressive | Rare and slight if present |
| Petechiæ | Common | Absent, or rare |
| Nephritis | About 50 per cent of cases; Higher in late stages — Albumin; erythrocytes; high value for blood urea is rare | Absent |
| Osler's nodes | Common | Rare |
| Janeway's nodes | Occurs, but not common | Absent |
| Infarction | Common | Absent or very rare |
| Purpura | Rare | Absent |
| Severe, diffuse, cutaneous lesions | Very rare | Absent |
| Temperature | Usually continuously above normal and often septic in type | Usually increased and intermittent |
| Spleen | Usually enlarged | Normal |
| Physical signs | Usually those of chronic valvular heart disease | In recurring type, those of chronic valvular heart disease |
| Auricular fibrillation | Rare | Common |
| Pericarditis | Rare | More common than other group |
| Course | Fatal, usually in two years | Tendency to recover with valvular defects |
| Involvement of joints | Absent or rare | Common |
| Acute myocarditis | About 23 per cent of cases that come to necropsy | 88 to 100 per cent of cases that come to necropsy |

ACUTE AND RECURRING RHEUMATIC ENDOCARDITIS

The etiology of rheumatic endocarditis is rheumatic fever. It should be emphasized that rheumatic fever is an infectious disease that is almost as widespread and extensive as syphilis and tuberculosis. It is fairly well agreed by the best authorities that rheumatic fever is due to infection with streptococci. In eliciting a history relative to the heart, it is a universal practice to ascertain whether or not the patient has ever had rheumatic fever, chorea, tonsillitis, scarlet fever, or "growing pains." In the majority of cases a definite history of rheumatic fever is obtainable. In other cases a positive history of chorea, tonsillitis, scarlet fever, and growing pains will be obtained. Growing pains are not always significant, but as Swift well pointed out, their occurrence in children, with infection, should be viewed with concern. It is becoming more evident, and in time there may be little doubt, that chorea, tonsillitis, and in certain instances, growing pains, are different clinical phenomena of that diffuse and extensive disease known as rheumatic fever. I do not believe that the common and acute follicular tonsillitis is often an etiologic factor in the production of endocarditis, but the tonsillitis that is part of the picture of rheumatic fever is a very important factor. Up to the present time these types of tonsillitis are not satisfactorily differentiated. Halsti, in his carefully controlled histologic studies, has shown that there are marked inflammatory foci in all types of diseased tonsils,

but that in the tonsils of patients with rheumatic polyarthritis or heart disease there occur more intense mural changes in arteries of medium size than are found in tonsils from patients with other diseases. Rheumatic endocarditis is more common in females than males. The disease usually makes itself manifest before the age of twenty-two years. It is rare for this disease to have its onset after the age of thirty-two years.

Table 2

DISTRIBUTION OF LESIONS IN 109 CASES OF RHEUMATIC ENDOCARDITIS

| | Acute | Chronic | Total | Per cent |
|---|---|---|---|---|
| Mitral valve | 42 | 57 | 99 | 90.8 |
| Aortic valve | 20 | 43 | 63 | 57.7 |
| Tricuspid valve | 19 | 26 | 45 | 41.0 |
| Pulmonic valve | 3 | 1 | 4 | 3.3 |
| Myocardium | 46 | 28 | 74 | 67.8 |
| Pericardium | 7 | 34 | 41 | 37.5 |

The early pathologic changes that occur are infiltration, induration, and edema of the cusps, and these changes may be restricted to a small area or they may be diffuse.[12]

The vegetations in the rheumatic group of endocarditis are small, rather firm, fairly smooth, globular or warty in appearance, and occur more often at a point of contact and on the free margins of the valves. They may be attached by pedicles of varying lengths.[11] The left side of the heart is more often involved than the right. Van Glahn, in a series of 109 cases, found the distribution of the lesions as given in Table 2.

The early vegetations are composed of bacteria, blood platelets, leukocytes and fibrin in varying degrees. The Aschoff body is characteristic of this lesion. It is described as a minute nodule, composed of wandering cells concentrically arranged, scattered throughout the heart wall and especially in relation with small arteries.[9] The vegetations are later replaced by connective tissue. The affected valves may be restored practically to a normal condition, or the process may extend to ulceration. The vegetations in this type of endocarditis rarely form emboli, and some writers go so far as to say they never do. In most instances, the valvulitis extends on to varying degrees of scarring and deformity.

Many theories are advanced concerning just how and when the initial lesion occurs. The three most probable sites are given as (1) the covering of the endocardium, (2) tissue in and about the blood vessels of the valves, and (3) the valve rings, from foci situated in them.[12]

The clinical course and physical features of acute and recurring rheumatic endocarditis often are not very definite or characteristic, and for this reason they are frequently overlooked.

In a case of rheumatic fever, whether it is the first siege or whether it is a recurring attack, if the patient becomes more toxic, if pulse and temperature rise in the presence of increasing pallor and without sufficient cause (that is, if the involved parts do not become aggravated) one should be suspicious of involvement of the endocardium. The objective cardiac signs that may appear early in the disease are slight roughening of the first sound at the apex, heart tones that are rather weak and lack definition, and often gallop rhythm. The roughening of the first sound may develop into a definite murmur.

Leukocytosis is present in about 40 to 50 per cent of the cases. As a rule, leukocytosis does not aid materially in distinguishing acute and recurring rheumatic endocarditis from subacute bacterial endocarditis. It is more common in acute and recurring rheumatic endocarditis. Leukopenia is extremely rare. Anemia, in contrast to leukopenia and leukocytosis, is a very important factor in the differential diagnosis of subacute bacterial and acute and recurring rheumatic endocarditis. Mild secondary anemia is not uncommon in acute and recurring rheumatic endocarditis, but is rarely as severe and progressive as it is in the subacute bacterial type. The same may be said concerning leukopenia as has been said concerning leukocytosis; that is, it is not a very important differential feature. Joints are involved in about 90 per cent of the cases at some stage of the disease. Nephritis in acute and recurring rheumatic endocarditis is extremely rare, whereas it is a common complication in subacute bacterial endocarditis.

### SUBACUTE BACTERIAL ENDOCARDITIS

The term "subacute" is not entirely satisfactory, but up to the present it more accurately describes the condition than any other term that has been presented. The term "acute" cannot be used because some of the patients live about two years. The term "chronic" is inapplicable because some of the patients may die within a month or so, and too, the term chronic well describes the scarred and deformed valve of rheumatic endocarditis.

Subacute bacterial endocarditis is practically always the result of *Streptococcus mitior (Streptococcus viridans)*. Libman found *Hemophilus influenzæ* (influenza bacillus) present in a higher percentage of his cases than has been found at The Mayo Clinic, where *Hemophilus influenzæ* has been found in only one case, and this case belonged to the acute rather than to the subacute bacterial group.

Subacute bacterial endocarditis practically always involves valves that have been previously injured, and the injury, in the majority of cases, has been due to previous rheumatic endocarditis. Occasionally the injury may be the result of a congenital defect, arteriosclerosis, or syphilis. The distribution of valvular lesions, that is, the order of frequency of valvular involvement, is essentially the same in the other forms of endocarditis.[4] Active pericarditis is very rare in subacute bacterial endocarditis. It occurs much more commonly in the rheumatic group of cases. The gross vegetations in this group are larger and more irregular than in the rheumatic group; they are soft, villus-like, and are not as smooth as the rheumatic vegetations. It is common to find several chordæ tendinæ severed.[9, 11]

The urine in this group of cases usually contains some erythrocytes, albumin, and occasionally casts, but as a rule renal function remains good up to the late or terminal stage.

The types of nephritis in subacute bacterial endocarditis are more interesting from a pathologic than from a clinical point of view. One of three types of nephritis may be associated with subacute bacterial endocarditis: (1) embolic nephritis, in which the kidney contains multiple small abscesses but has relatively good renal function; (2) diffuse nephritis that is due to gross infarction, and (3) diffuse subacute glomerulonephritis. In a small percentage of cases, all the glomeruli will be involved, and microscopically the condition looks like that seen in true diffuse glomerular nephritis.

If the concentration of urea in the blood rises to 250 or 300 mg. in each 100 c.c. before death, usually one can predict, with a fair degree of accuracy, that diffuse subacute glomerulonephritis will be found at necropsy.[2]

Baehr described the salient features of the glomerular lesions as "involvement of one or more loops of a variable number of glomeruli and an absence of any visible disease in the uninvolved portions of the affected glomeruli."

These patients usually look sick, and as a rule they are. Their temperature usually is continuously above normal, and it is often septic in type. There are afebrile stages that have been described. The patients may have pain that involves the muscles and joints. As a rule, however, the pain is not severe, and the regions of involvement are not so extensive as in the rheumatic group of cases. The objective cardiac findings are usually those of preëxisting valvular disease.

Petechiæ are common. They occur on skin and mucous membranes. Most often they occur on the anterior surfaces of arms, hands, and body. The conjunctiva of the lower lids is a very common site of petechiæ, and their occurrence in this region is almost pathognomonic of the disease. Petechiæ on the conjunctiva usually occur singly, and have a creamy-white center. The petechiæ occasionally occur in groups or showers. They may be present for a few days and then disappear, to be followed by another shower. They may be numerous or there may be just a few in scattered areas.

Janeway's lesions are not common, but do occur. They are described as small, slightly nodular hemorrhagic lesions, not tender, and occurring principally on the palms of the hands and the soles of the feet.[14]

Rheumatic nodules, originally described by Meynet, are also known as Osler's nodes. Osler described them as small, firm, hard subcutaneous nodules, that vary in size from that of a small shot to that of a large pea, and which occur most frequently on fingers, hands and wrists. They may occur on the elbows, feet, knees and back. As a rule, they are distinctly tender and painful. They may last from a few days to a few weeks, and even months. They are made up of round and spindle-shaped cells.

Purpura may occur, but it is rare. A few cases in which there were severe, diffuse, erythematous lesions have been described.[5] Judging from the duration of the clinical course of the cases reported in which these erythematous lesions have occurred, it appears that they should be classified with the cases of acute bacterial rather than with the cases of subacute bacterial endocarditis. Infarction of the spleen, kidneys, and brain is common. Anemia is present and usually is marked and progressive. Leukocytosis is very rare unless sepsis is present. Leukopenia occasionally occurs. Active peri-

carditis is rare in subacute bacterial endocarditis, but scarring due to preëxisting pericarditis is fairly common. Auricular fibrillation is very rare in subacute bacterial endocarditis,[8] but common in the recurring rheumatic form. Splenomegaly is present in the majority of cases. It occurred in only 46 per cent of Clawson and Bell's cases. Fox, in his pathologic studies, found infarct to be the most important gross lesion in the spleen, and perisplenitis was present in practically every case. He found further that the enlargement of the spleen was due mainly to the infarcts, generally hyperplasia, and increase in the amount of blood.

Positive blood culture is present in about 85 to 90 per cent of the cases, and in the atypical cases this is probably the most important factor in making a diagnosis.

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## NAME OF NARCOTICS DIVISION CHANGED TO DIVISION OF MENTAL HYGIENE

In a recent report, Surgeon General H. S. Cumming of the Public Health Service indicates that the year ended June 30, 1930, has been characterized by additional legislation seeking to coördinate and crystallize the functions of the Narcotics Division, now designated by law as Division of Mental Hygiene.

At the close of the year, the functions of the Division of Mental Hygiene, in the office of the Surgeon General, included the administration of the two recently authorized United States narcotic farms; studies and investigations of the nature of drug addiction and the best methods of treatment and rehabilitation of persons addicted to the use of habit-forming drugs; the dissemination of information on methods of treatment and research in this particular field; coöperation with State and local jurisdictions with a view to their providing facilities for the care and treatment of narcotic addicts; the supervising and furnishing of medical and psychiatric service in Federal penal and correctional institutions; studies and investigations of the abusive use of narcotic drugs and the quantities of such drugs necessary to supply the normal and emergency medicinal and scientific requirements of the United States; and, lastly, studies and investigations of the causes, prevalence, and means for the prevention and treatment of mental and nervous diseases.

The site for the first United States Narcotic Farm has been selected at Lexington, Kentucky, and plans are under way for the development of the necessary buildings thereon. Medical officers have been assigned to the medical and psychiatric clinics established at the several penal and correctional institutions.

# AN UNEXPLOITED THERAPEUTIC OPPORTUNITY IN PERIODIC HEALTH EXAMINATIONS OF YOUNG ADULTS*

NORMAN JOHNSON, M.D.
*Minneapolis*

THE following paper presents certain ideas which have crystallized out from time to time in meditations over a type of problem seen frequently by internists, the answer to which problem seems never to have been attacked in any organized way either in medical education or to any degree in the literature. The reason why we do not cope well with these problems in our education is chiefly because we are so ignorant,—ignorant of the factors involved and especially ignorant of how to cope effectually with such of the factors as we do partially understand. Then too, we are, as a branch of science, very prone to investigate, to show a studious interest in, and to teach, only subject matter which can be proved in a test-tube, reduced to a mathematical formula, or is otherwise susceptible of laboratory methods of examination. Such a tendency is unfortunate, but it is a line of least resistance and therefore one which will probably be continued. It falls down in clinical practice because the human being cannot be reduced to a mathematical formula or a test-tube reaction.

These are the clinical events which prompted my subject for this paper. In one period of ten days during the past year I had to advise four men that they abandon all business immediately for a period of time, varying from a few days to four months. One was a lawyer whose chief complaint was right upper quadrant colic for which pathology could not be demonstrated—a functional spasm perhaps. Another was the business physician for one of the largest lumber interests in the country,—the man on whom the business difficulties eventually were unloaded for settlement. He had reached a point where he would break into a profuse perspiration on trying to open a window, and he admitted that to put his head out of the window and scream would have afforded him considerable relief. The third man was one of a firm faced with insolvency. He came to me because he could not sleep except with sedatives, and then not more than four hours a night. He was losing weight, becoming very nervous and irritable, and during a few weeks time his blood pressure mounted twenty points to 160 systolic. He was able with guidance to close out his business without a break in compensation. A new business venture was successful for a time. During this period, he slept well without drugs, gained weight, lost his nervousness, and experienced a drop in blood pressure, but with the business depression last Spring, difficulties again developed and the whole syndrome, augmented by transient paling of finger tips, loss of appetite, despondency, and sweating, recurred. He could not talk about his business without tears. Thyroidism was suspected but could not be proved. He could not sleep even with drugs. During this period the blood pressure elevation reached 190/110. A vacation of four months was insisted upon. He closed out his business and when last heard from was markedly improved in every way except financially. The interesting corollary is that his brother—a business partner—went through the same experiences without having to consult a doctor. What is the difference in these two men? It is of course the difference in what we label "temperament"; it is the difference in equanimity or in mental serenity while under pressure. The one, through his thoughts, fears, blasted hopes, worries, disappointments, upsets the balance in his vegetative nervous system with resultant physical symptoms. The other went through the same experience and was still able to carry on at the time he most needed to carry on.

These are the simpler types of cases which seem clean cut. To carry the concept of symptom-etiology further into pseudo-clinical entities is a procedure fraught with danger and difficulty. The possibility of the existence of true physical disease in spite of inability to prove its actuality will always remain to plague the diagnostician with doubt. To illustrate: the head of a large mercantile establishment has had four attacks of acute right lower quadrant pain closely resem-

*Read before the Minnesota Society of Internal Medicine, Rochester, November 10, 1930.

bling appendicitis. All of these attacks have disappeared after twenty-four to thirty-six hours of rest in bed. I have not yet felt fully justified in advising operation in any attack, chiefly because I know his temperament rather well and suspect he may be producing these attacks himself. In support of this belief is an X-ray diagnosis of spastic colon. I also see him occasionally for attacks of extrasystoles which he may well bring on himself through a state of high nervous tension. As a parallel case, I have that of a music teacher who taught fifty-four music pupils a week, became engaged, married—with all the social obligations attendant thereto—did her own housework, and, following a period of great excitement one evening, developed acute epigastric pain, vomiting and some diarrhea. After thirty-six hours, the pain localized in the right lower quadrant, the leukocytes reached 13,000 (note vomiting and diarrhea) and a surgical consultant thought he could palpate an appendiceal abscess. Operation revealed a normal appendix and no explanation for the pain or vomiting was forthcoming. However, right lower quadrant pain severe enough to require day and night special nurses continued for three weeks after operation.

Now none of these patients, except the bride, was neurotic or hysterical. If any practice contributes four cases in ten days of any one condition sufficiently severe to disable a patient, that condition must be an important factor and worthy of reflection. If there are cases producing disability, there are many more of lesser degree. In other words, organic dysfunctions not due to disease, hysteria, or neurosis must be fairly common in life, and the internist will be the logical one to see many of these cases. I believe that a large percentage of our working population are potentially cripples or may become so under a given situation or succession of adverse circumstances. I have asked myself time and again,—why do we have these physical manifestations of dysfunction? What can we do to prevent them?

The answer to the first question is obvious. So far as our motor and secretory functions are concerned, we are all controlled by a vegetative nervous system. Much has been said and written, but little is actually known, about this control. We know that, with a few exceptions such as bladder and rectum, these functions are beyond control of the will, but they are very much influenced by emotional stimuli. We have heard of the vasotonic and sympathetico-tonic types of individuals, but these labels connote an inherent or inborn imbalance of the vegetative nervous system and comprise only a small group of the total population, whereas I believe that a great many of us actually develop a very hair-trigger mechanism to all autonomic reactions.

One recent piece of physiological research may have bearing as evidence in incriminating the autonomic nervous system as a source of disability. In working on conditioned reflexes in dogs, attempt was made to quantitate the response to stimuli. Interpretation of results seemed to show that where the stimulus was pleasurable, repetition over longer periods seemed to cause progressively diminishing response (saliva containing less solids and of lower specific gravity) whereas if repetition of unpleasant stimuli was tried, intensification of the reflex action seemed to increase with the same strength of stimulus. If true, this may be exceedingly important to the human undergoing recurrent unpleasant experiences.

There are many disease entities of unknown etiology which might with some justification be assigned as to origin to a disturbance, prolonged over many years' time, in the delicate adjustments affecting motility, secretion, or irritability of organic structures. Such a group might include the primary disorders in vascular control such as Raynaud's coronary disease, hypertension, or angio-neurotic edema. It could also be extended to include diseases due to sudden change in the vascular flow, such as certain headaches, epilepsy, periodic amblyopia, abdominal migraine, acrocyanosis, hay fever, and many gastro-intestinal complaints. In the same related group might also be placed asthma, exophthalmic goiter, Hirschsprung's disease, spastic constipation, certain diarrheas, and even ulcer and diabetes. If entities such as these may be related to imbalance in vegetative control, then there must be also a large group of symptomatic difficulties with a similar basis in etiology that can attack the human, even to the degree of complete disability. This I believe to be the cause of at least some of the disabilities in the cases mentioned,—which brings me to the second query—What can be done about it?

To attempt to change the habits of thought, or the state of mind or of temperament, in a man or woman of forty-five is not easy. It may not even be possible. I would rather attempt to

change his religious or political prejudices. In each of the cases mentioned, the end-result was satisfactory and yet the treatment was only palliative—which is not the highest goal of therapeutic achievement. What *can* one do? He may give advice to stop worrying, which doesn't stop the worrying. He may comb the body for foci on which to put the onus of symptoms. He may give sedatives, or medication designed to alleviate the presenting symptoms, just as he may give insulin to the diabetic, which will not often cure the diabetes though symptoms are relieved. Or, better yet, he may attempt to strike prophylactically at the source.

This is now the fifth year that I have had the pleasant experience of making periodic health examinations on students at the University. Except for some entering freshmen in the past two years, these are graduate students. They fill out an extensive questionnaire, have performed a very complete set of routine laboratory tests and come to the physician for a thorough physical examination and a survey. The defects in habit or physical equipment, and all symptoms complained of, are discussed and appropriate advice given. One hour for each student is the allotment with the physician. Some require less time; some a great deal more. It is in talking with and studying these students that many illuminating and thought-provoking problems occur. Together with a great many other things, I am sure I can find amongst this selected group of approximately healthy beings, the prototypes—the anlage if you will—of the type of person mentioned before. These defects which, under given conditions, may produce disability, or unhappiness, are not necessarily a heritage. More frequently, the student himself develops the mental state which makes him so vulnerable to the buffets of a competitive and sometimes cruel life ten or twenty years later. It is my belief that mental reaction habits are formed during school years, along with a great many other reactions to which a person by constant and daily repetition becomes habituated. For instance, most students have early formed the habit of washing their faces in the morning—a simple thing—and yet it has become so much a part of their lives that to remove this daily ritual would make them decidedly uncomfortable—for a time at least. Likewise, they are forming or have already formed habits of study, of eating, of sleeping, of defecation, of exercise, all of which they will continue as they have begun unless something interrupts the habit-continuity. If this is true, it should be profitable to enlist the intelligence of the youth himself toward making some definite attempt to shape up a group of habits which will not leave him vulnerable later. Better steer a course than float blindly with the stream. From the time he leaves the pediatrician, and discards his blind allegiance to parental advice, until he finds himself in trouble, there is no one making any organized attempt to train the individual toward the ability to remain serene under adversity or pressure. This is a period of twenty years or more, and when it is over, whatever has been put together by haphazard methods is so thoroughly "gelled" that it cannot be undone if it is bad. All of which is one reason why so many excellently trained and talented men and women are prevented by their own temperamental limitations from accomplishing anything "big." They "crack up" under pressure because they do not know how to use their capacities to fullest advantage.

There is no science to aid the physician who attempts to guide the youth in developing what I have called mental serenity. Perhaps the Christian Scientists do it passingly well. Osler, in a little essay delivered to the Yale students called "A Way of Life," has told how he worked out his own salvation to permit him to accomplish a very busy life without physical disaster. He also has written his famous essay on equanimity. These furnish the germ of the idea which I am trying to present, *i.e.*, of the necessity for making an effort to develop, along with other developments, the ability to handle oneself. If a man spent one quarter of the time and effort which he uses to make his business efficient toward making himself a smoothly running machine, there would be fewer casualties and more genius available.

The earlier a beginning can be made in such training, the easier obtained the results. I speak from an experience only with students, which is a select group having distinct and specific problems not occurring in the world at large. Yet the general reactions of nervous excitability, of too great intensity, over-conscientiousness, and self-consciousness, are present everywhere, and the stimuli which serve to aggravate them may be found in one form on the campus and in another in the shop. Only, I believe, the more highly organized the intelligence, the greater the sus-

ceptibility to overstimulation. Hence the college campus should furnish more material per capita than the industrial plant.

The specific points to be emphasized in the hope of creating an intelligent awakening in the student toward what he is doing may be only mentioned in passing. Each person presents a different combination, and each needs an individualized approach. One of the numerically greatest of the habits which I ask the student to consider is that of a highly developed sense of duty coupled with a false standard of values—the conscientious student. He, or usually she, received high marks in high school where effort and conscientiousness receive their reward in grades. In the University, this student is just another Ford being put through the factory, and grades are issued impersonally on the basis of an examination which may have created such a psychic response in this particular student at the time it was given as to result in a poor grade. Then the next examination is worse and I have repeatedly seen students of eighteen with constant pulse rates over 100, blood pressure near 160 systolic, even at rest, who admit to being paralyzed with fear at each successive examination. The fault here is the universal emphasis on the importance of the grade as an index of the efficacy of time spent in college. No one yet has been eminently successful in life because of high marks in college, but many have failed in life because, in striving over four to twelve years for high grades, they have only learned the ability to get out of control—vegetatively speaking.

So I try to teach them, if conscientious, that it is important to know when to be and when not to be conscientious.

Then there are the high degrees of self-consciousness, always coupled with a high degree of instability in the vegetative nervous system. Four years of improper handling in college may clinch for this student a reaction habit which will end in his downfall when put under pressure. For instance, one senior dentist told me that, as a freshman seven years before, he was so self-conscious that he would go many blocks beyond his car-stop before he could bring himself to push the button. Imagine this man thrown out into the business world! How vulnerable he would be to physical catastrophe! This type I usually send to the mental hygienist. They are very difficult.

Again there is the boy who must, outside of school, work forty hours a week in order to support himself in graduate school. The mere situation of being constantly behind day after day, of being constantly pushed for time between his job, his classroom, his studies, meals and sleep—always at the expense of outdoor relaxation—creates in a few months' time a state of sustained intensity. They are always tense. Blood pressures and pulse rates are frequently elevated. In life afterward they will be the high-pressure big-business men and perhaps will die of coronary disease at fifty. This type needs to be taught the value of artificial relaxation, of utilizing short snatches of time for turning off the switch, and that is a very difficult thing to learn—how to turn off the switch. Especially they must learn Osler's dictum of living in water-tight and air-tight compartments of twenty-four hours each, and of not projecting themselves into the mass of work waiting to be done until it is time to be there in person. Though the individual may need to work fast, he must also learn how to segregate physical speed and to eliminate mental hurry. To use a railroad analogy, living in the block system is one thing a great many of us could learn with profit.

There is a question to be checked: "Do you worry?" Here the examiner must be careful. It is frequently answered in the affirmative but usually the worry is only a minor feature, perhaps about whether or not the money will last out the term. Occasionally the affirmation was furtive and you catch a suspicious circumstance in the way your questions are answered. It is not at all remarkable to uncover here a problem of considerable magnitude. But also, questioning may uncover that vicious fault in any age—the chronic worrier. Perhaps some are born with the attitude; perhaps it is developed from parental examples; I am sure it can be learned and amplified in college life. I have tried to formulate a succinct expression for use to instruct this type. I point out the block system type of life, but above all I emphasize doing a thing to the best of one's ability and then facing the consequences, whatever they may be. It is fear of consequences which seems to me to keep this type in a state of constant mental agitation.

These few examples will suffice to show what seems to me to be a therapeutic field of considerable importance. It borders on the psychiatrist's province but he is as unqualified from the physical-clinical side as an internist is on the

technical side of psychiatry. Besides, we have very few psychiatrists with us. The essential therapeutic duty of the internist is, after all, that of a teacher. We have only a dozen or so specific cures. We have to instruct the cardiac patient on how to live best with whatever type of heart trouble he has. We teach the diabetic how to manage his disease. Why is it not as justifiable for us to attempt to teach the youth how to avoid functional disabilities as it is to educate them on how to avoid tuberculosis or venereal disease. Only the program is very much more difficult to put over for the reason that it cannot be learned in one year of effort any more than one can play symphonies after one year of piano lessons. That is why the college course is so admirably suited to this therapeutic attack. The student is devoting four years to education, usually without other major responsibilities. He is above average intelligence, can grasp its significance, and is receptive. He is still in his formative years and the physician can take inventory with him annually, or oftener if desired, giving encouragement and advice. I make a plea merely that we shall be somewhat aggressive in seizing any opportunity given us to add to his educational armament some instruction in the Art of Living and incidentally in stopping at its source one agency of disease.

338 LaSalle Building.

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## THE STROOPAL FRAUD

For many years a nostrum known as Stroopal has been sold on both sides of the Atlantic as a cure for cancer. The product apparently originated in Germany. For some years it was exploited from London and was exposed by London *Truth* nearly twenty years ago. According to Gehe's Codex, Stroopal is composed of the powdered leaves of *Teucrium Scordium*, otherwise known as water germander or wood garlic. For at least seventeen years, Stroopal has been exploited in a small way from Chicago. Recently, Stroopal seems to have been advertised under the name of the Stroopal Company, 2101 Belmont Ave., Chicago. On August 13, the postal authorities issued a fraud order against the Stroopal Company and notified the Chicago postmaster to return all letters addressed to the Stroopal Company to the original senders. (Jour. A. M. A., October 4, 1930, p. 1037.)

## THE HORMONE OF THE ADRENAL CORTEX

The Swingle-Pfiffner cortical hormone "extract" has been tested in cases of Addison's disease at the Mayo Clinic. Hartman, Brownell and Hartman also have been able to prepare an extract of the adrenal cortex that will prolong the lives of adrenalectomized animals indefinitely. They also have revived a patient with Addison's disease having a systolic blood pressure of 50 mm. and a pulse of 120 a minute by the use of their preparation of the hormone, for which they propose the name Cortin. "Cortin" administered by mouth appears to give little or no benefit. It is best administered subcutaneously except in circulatory failure in which absorption is greatly reduced; then intravenous injection is employed. One may soon confidently expect the relief of the dire Addison's disease by the cortical hormone. (Jour. A. M. A., January 24, 1931, p. 273.)

# SPINAL ANESTHESIA*

RALPH M. TOVELL, M.D.
*Rochester, Minnesota*

SPINAL anesthesia, or subarachnoid block, was first advocated by Corning in 1885. Although Corning's report was based on a false premise his suggestions led to discovery of the truth. In the course of experimental work on root pain, while he was doing a paravertebral injection with cocaine, he accidentally produced spinal anesthesia. He said that it was not essential to deposit the solution within the dura, but that close proximity to the spinal cord or its coverings was sufficient. He based his conclusion on the supposition that the solution would be carried into the spinal canal by the blood vessels. It is now known that this is an erroneous view. Since then the technic has varied, and this method of anesthesia has had brief periods of popularity. With the discovery of procaine, an added factor of safety was found, but not until the use of ephedrine became general did spinal anesthesia gain real favor. During the stages of transition the physiologic changes due to blocking of the spinal rami have become more evident and a rather precise technic has been developed.

## SIGNIFICANT CONSIDERATIONS

There are several considerations of significance in the administration of a spinal anesthetic agent: (1) Choice of patients, (2) preliminary medication, (3) dose, (4) site of injection, (5) amount of spinal fluid to be withdrawn in which the crystals of procaine will be dissolved, and (6) rate of injection. I shall consider these points in the order given.

*Choice of patients.*—Extreme differences of opinion regarding the safety of spinal anesthesia have been expressed by various authorities. At The Mayo Clinic, the use of spinal anesthesia has been limited to operations below the diaphragm. This method is indicated particularly for patients suffering from emphysema, advanced asthma, chronic bronchitis, and other respiratory conditions, for whom a general anesthetic given by inhalation is contraindicated. Spinal anesthesia may be warranted for patients suffering from intestinal obstruction, extravasation of urine, or senile or diabetic gangrene, in whom the disturbance occasioned by a general anesthetic often diminishes chances for recovery. It is also useful for catheterization of the ureters in a patient in whom a highly sensitive tuberculous or cord bladder is present. Because a few centigrams of the drug have so little effect on the general cellular metabolism, spinal anesthesia is indicated in cases in which the kidneys are not functioning properly. Throughout this country the popular tendency is toward the use of spinal anesthesia for all operations below the diaphragm except in cases in which certain conditions are present, as follows:

1. The procedure is contraindicated in the presence of involvement of the central nervous system by a tumor of the spinal cord, syphilis, epilepsy, intracranial hemorrhage or intraspinal hemorrhage. Cases in which the spinal fluid is turbid, although no other pathologic change is found, should be included in this group.[3]

2. Local pathologic processes at the intended site of injection preclude its use.

3. Patients in whom the blood pressure is extremely high generally experience marked reactions following induction of spinal anesthesia, and in such subjects the dose used must be conservative. Patients with hypotension are often poor operative risks, especially if cyanosis and decompensation are present. Operations above the lower part of the abdomen should not be performed under spinal anesthesia if the systolic blood pressure is below 100 mm. of mercury unless a general anesthetic is absolutely contraindicated.

4. Patients in a state of severe traumatic shock are poor risks for any form of anesthesia. If the shock is not of hemorrhagic origin spinal anesthesia may be used, and is satisfactory when crushing injuries involving the lower extremities are to be treated. In some in-

*From the Section on Anesthesia, The Mayo Clinic, Rochester, Minnesota.

stances, due to the breaking of the reflex arc, shock may be partially controlled by the anesthesia. I used the phrase "not of hemorrhagic origin" advisedly because, in a recent article, Burch, Harrison and Blalock reported that hemorrhage in spinal anesthesia is much more likely to cause shock than the same blood loss under ether. Under ether anesthesia, withdrawal of blood equal to 3 or 4 per cent of body weight produced marked decline in cardiac output and blood pressure, but the animals were not in grave danger of immediate death. Under spinal anesthesia death was produced by removing an amount of blood which varied from 0.5 to 1.6 per cent of the body weight. It would seem, therefore, that spinal anesthesia is contraindicated if patients have lost a great deal of blood or if severe loss of blood during the operation is anticipated.

5. Spinal anesthesia should not be used for patients with septicemia or pyemia. The protective barrier between the infected blood and the nerve centers would be eliminated by the puncture.

6. For patients with diminished breathing capacity due to pleural effusions or intrathoracic tumors, combined with lower concentration of hemoglobin, spinal anesthesia is definitely contraindicated.

*Preliminary medication.*—Several drugs in different combinations and doses have been tried to control the patient's natural dread of an operation, and at the same time to insure his cooperation. The evening previous to operation sodium ethyl methyl butyl barbiturate (nembutal) 100 to 200 mg. (1½ to 3 grains) are given by mouth. One hour before operation it is of benefit to repeat the dose of the barbiturate and to administer morphine sulphate in a dose of 10 to 16 mg. (1/6 to ¼ grain) hypodermically. Instead of the barbiturate and morphine on the morning of operation, 10 mg. (1/6 grain) of morphine sulphate with 0.3 mg. (1/200 grain) of scopolamine hydrobromide may be given one and a half hours before operation and the scopolamine may be repeated one hour later, if necessary. In my experience, the combination of morphine and sodium ethyl methyl butyl barbiturate has been preferred. Unless it is intended that the spinal be combined with a general anesthetic, atropine is probably best omitted, because atropine has a characteristic action of paralyzing the myoneural juncture of all nerves which supply unstriated muscle. The line for vagal innervation is thus broken, and contraction of the intestines is rendered difficult even after the inhibitory sympathetic innervation is paralyzed following subarachnoid block. Therefore when contraction of the intestines is desired administration of atropine defeats one's purpose.

*Dose.*—As a routine, the history and physical condition are reviewed to discover possible contraindication to spinal block. On arrival in the operating room, the patient's blood pressure, age, weight and height are ascertained. An estimate of the patient's resistance is made and the dose of procaine is decided on, taking these factors into consideration, together with the site and the possible duration of the operation. In my opinion, from 1 to 1.5 mg. (1/64 to 1/40 grain) for each pound (0.55 kg.) of body weight is the best guide in the calculation of the dose of procaine, with 300 mg. (5 grains) as the maximal amount for any operation. The smaller doses should be given to old and debilitated patients, who are affected by hypotension and cardiac disease, recent extreme loss of weight, or decreased respiratory surface and lowered concentration of hemoglobin, with the attendant decrease in the power of the blood to carry oxygen. For operations on the extremities, perineum, or urinary bladder, I have found that a dose of 80 to 120 mg. (1 1/5 to 2 grains) of procaine is ample. For operations on the lower part of the abdomen 120 to 150 mg. (2 to 2 2-5 grains) is required, whereas for operations on the upper part of the abdomen, the gallbladder and the stomach, 150 to 300 mg. (2 2-5 to 5 grains) may be given.

If the blood pressure is normal, a hypodermic injection of 50 mg. (¾ grain) of ephedrine should be given five to ten minutes before introduction of the anesthetic agent. If the blood pressure is 160 mm. of mercury or higher, it may be desirable to delay the injection of ephedrine until the lumbar puncture needle is in place. Thus, if the lumbar puncture cannot be completed, one is guarded against unduly raising the blood pressure. If the systolic pressure is less than 100 mm. of mercury, it is advisable to give 50 mg. (¾

grain) of ephedrine twenty minutes before the spinal anesthetic is introduced; unless there is some response to the ephedrine it is advisable to use only a small dose of procaine. If the systolic blood pressure is much lower than 100 mm. of mercury, it usually is not advisable to give a spinal anesthetic unless the fall of blood pressure is due to the derivative of barbituric acid used in preliminary medication. One should not be unduly alarmed by such a drop in blood pressure when estimating the dose of procaine.

*Site of injection.*—For operations on the lower part of the abdomen, puncture is made between the third and fourth lumbar vertebræ, and for operations on the upper part of the abdomen, injection is made between the second and third lumbar vertebræ. Recently, at the clinic, we have found that for operation on the gallbladder and stomach injection is better made between the first and second lumbar vertebræ; occasionally injection has been made between the twelfth thoracic and the first lumbar vertebræ with good results.

TABULATION

DOSAGE AND DILUTION OF PROCAINE IN SPINAL ANESTHESIA*

| Operation | Site of injection between lumbar vertebræ | Dose of procaine, mg. | Amount of spinal fluid, c.c. |
|---|---|---|---|
| Amputation of leg | 3 and 4 | 100 to 120 | 3 |
| Prostatectomy | 3 and 4 | 100 to 120 | 3.5 |
| Herniotomy (inguinal) | 3 and 4 | 120 to 150 | 3.5 |
| Appendectomy | 2 and 3 | 120 to 150 | 4 |
| Colostomy | 2 and 3 | 120 to 150 | 5 |
| Hysterectomy | 2 and 3 | 150 to 200 | 5 |
| On gallbladder | 1 and 2 | 150 to 200 | 5 |
| On stomach | 1 and 2 | 200 to 250 | 6 |

*Spinal needle, gauge: 20 to 22.
Rate of injection: 0.25 c.c. each second.

*Amount of spinal fluid withdrawn.*—For operations on the extremities and lower half of the abdomen, for example, for cystostomy, prostatectomy or herniotomy, anesthesia will be sufficiently high if the crystals of procaine are dissolved in 3 c.c. of spinal fluid; for operations on the colon, 4 to 5 c.c. is sufficient. For operations on the gallbladder and its ducts about 5 c.c. of fluid generally proves satisfactory, whereas operations on the stomach require 6 c.c. of spinal fluid. In operations on the pelvis, such as hysterectomy, when packing off is likely to cause a feeling of fullness and distress in breathing, anesthesia must be fairly high (must extend fairly well cephalad) and 5 c.c. of spinal fluid is required. The height of anesthesia varies directly with the dilution; the higher the anesthesia desired, the greater should be the dilution. The dosage of procaine affects directly the duration of anesthesia; the larger the dose, the longer is anesthesia maintained. Directions for various operations are given in the tabulation.

*Rate and technic of injection.*—The method of induction of spinal anesthesia is as follows: The patient is placed horizontally on his side on a cart or operating room table. The blood pressure is taken, and the back is cleansed with ether. An assistant draws up the patient's knees and brings the head downward to get maximal bowing of the vertebræ without producing discomfort. A wide area over the lumbar and upper part of the sacral region is sterilized with iodin, and a sterile towel is draped across the area, with its vertical edge at the intercristal line, crossing the vertebral column at the level of the spine of the fourth lumbar vertebra. The interspace desired can be counted from this point. In obese patients, when the level of the intercristal line is obscure, the spine of the first lumbar vertebra can be found by the following maneuver and the site of injection determined. A point 7 cm. (or four fingers' breadth) from the median line is determined on each side at the lower border of the twelfth rib. The line joining these points crosses the vertebral column at the level of the spine of the first lumbar vertebra. As a final step, a perineal sheet is used to outline further the sterile field.

When the proper interspace has been determined, a cutaneous wheal is raised with a wheal needle; with a 50 mm. needle, 4 c.c. of 1 per cent solution of procaine, and 50 mg. of ephedrine are infiltrated along the course that the needle used for the puncture is to follow. The spinal needle, gauge 20 or 22, is inserted, and from 3 to 4 c.c. of spinal fluid is allowed to flow into the ampule containing the procaine. The stylet is then inserted to prevent further outflow of spinal fluid. The procaine

is dissolved readily by repeated aspiration. The solution is then aspirated into the syringe from the ampule, the stylet is removed, the syringe is connected with the needle which has been inserted in the spinal canal, and the remainder of the estimated amount of fluid required is gently withdrawn. The solution is then injected, without pause, at a rate of 0.25 c.c. each second. As a check on the technic it is advisable immediately after injection is finished to aspirate 0.5 c.c. of spinal fluid. It is always a satisfaction to have spinal fluid aspirate freely and thus to know that the needle is still in the proper position.

The patient is then turned on his back and the head of the table may be lowered slightly until the operation is completed. The full Trendelenburg position may be employed if the surgeon desires. All changes of position should be made slowly and gently to prevent nausea, vomiting and respiratory embarrassment. Anesthesia develops in from four to ten minutes and is maintained for thirty to seventy minutes. For three hours after the operation the patient is kept lying flat on his back and the head is not elevated.

### DESIRABLE AND UNDESIRABLE EFFECTS

Ideal spinal anesthesia insures perfect relaxation of the abdominal wall, contraction of the intestines, and consequent ease of exposure. Unfortunately, certain complications may occur both during and after operation. Failure to obtain anesthesia is disconcerting, but is due generally to faulty technic rather than to anatomic anomalies. If the anesthesia is not effective twenty minutes following the injection, a second injection may be made with comparative safety. Anesthesia which develops to within 3 to 7 cm. of the height desired is annoying but it may be supplemented with local infiltration of 0.5 per cent procaine, or nitrous oxide may be given.

During the first twenty minutes, there is usually a fall in the blood pressure of from 15 to 20 mm. A continued drop is of some concern. Three factors are involved.

The first factor is loss of vasomotor control. Normally there is a balance between the vasoconstrictors and the vasodilators.[6] If the vasoconstrictors or sympathetic fibers which arise from the first thoracic to the third lumbar vertebræ are paralyzed, the vasodilators or parasympathetic nerves, particularly the vagus nerves, become overactive and the blood vessels in the abdominal region dilate. The degree of drop in blood pressure is determined, to a large extent, by the height of the anesthesia and the number of sympathetic nerves involved. Fairly high anesthesia may be obtained without any alarming drop in blood pressure if the major portion of the procaine is deposited posterior to the ligamentum denticulatum and therefore more intimately in contact with the sensory than with the motor roots.[4] To accomplish this, and to prevent the solution escaping anteriorly through the denticulate margin of the ligament, injection of the procaine must be slow.

The second factor, slowing of the cardiac rate, depends on loss of balance between the vagus nerves, or inhibitory nerves, and the sympathetic or accelerator nerves. If the sympathetic fibers from the first to the fourth thoracic segments are anesthetized, the vagus nerves are left in control and produce slowing of the heart.

The third factor involved in the fall in blood pressure is paralysis of the thoracic and abdominal muscles. The pumping or aspirating action of the thorax is diminished; the heart receives a smaller amount of blood, and is therefore unable to supply the normal quantity to the brain. Cerebral anemia thus can develop. The Trendelenburg position is the essential treatment to offset this complication. Five minims of epinephrine administered subcutaneously may be given and the dose repeated once or twice. If the drop in blood pressure is late in the operation and is due to surgical shock, intravenous injection of physiologic solution of sodium chloride may be required.

With the fall in blood pressure there may be pallor, nausea, retching, and vomiting. Treatment of the fall in blood pressure ordinarily alleviates the nausea. The nausea often is psychic, depending on the mental impressions of an overactive mind. Sufficient preliminary medication and an entertaining anesthetist may eliminate this complication. The nausea may be reflex, caused by packing off too tightly or by manipulation of viscera of the upper part of the abdomen. The surgeon's coöperation

is essential here. The treatment also includes deep breathing through the mouth, or intermittent inhalation of a mixture of 90 per cent oxygen and 10 per cent carbon dioxide. By this method, the pumping action of the thorax is improved, the blood pressure is raised, and the nausea is decreased. In a small percentage of cases, the retching may be so annoying to the surgeon that supplementary anesthesia with nitrous oxide or ethylene will be required.

Following the operation, headache is the most common complication. The patients usually complain of occipital pain appearing twenty-four hours after operation, which is worse when the head and shoulders are raised and is relieved when the head is lowered again. This pain is thought to be due to continued loss of spinal fluid through the lumbar puncture wound in those cases in which the arachnoid clings to the spinal needle as it is withdrawn and the arachnoid is herniated through the dura. This condition is rather intractable to any form of treatment and may linger for several days or weeks, but eventually it clears spontaneously. The incidence of headache is no greater following spinal anesthesia than following lumbar puncture for diagnosis when from 6 to 7 c.c. of spinal fluid has been withdrawn. It has been reported that a retention enema of 180 c.c. (6 ounces) of 50 per cent solution of magnesium sulphate gives relief. Surgical pituitrin, one ampule, or ephedrine, 50 mg. (¾ grain), given hypodermically produces improvement in some cases, but the essential factor in the ultimate result is time.

Meningitis is an ever-present possibility, but with aseptic technic such a complication can be avoided. Regions of numbness in the legs may persist for some time, but this numbness usually disappears without treatment. Ocular palsy, involving the lateral rectus muscles, is rare, but it may develop in the second week following operation. Squint develops and the patient complains of double vision. Fortunately, all such conditions reported have cleared without treatment. These complications are not common, but should always be thought of as possibilities. They have not been of sufficient significance to prevent spinal anesthesia increasing steadily in popularity.

In surgical procedures on the upper part of the abdomen particularly, nausea, and anesthesia of too short duration, are real problems. Variations in dose of procaine, in amount of spinal fluid used as a solvent, and in rate of injection, all have been given a trial. The incidence of nausea is highest in upper abdominal operations, but I still feel that to obtain satisfactory high anesthesia of sufficient duration, the dose of procaine should not be increased beyond the estimated limit of safety.

## COMMENT

Properly induced spinal anesthesia, using any of the approved methods, produces complete freedom from pain in the operative field, absolute relaxation of muscles, contraction of the intestines, and relaxation of the anal sphincters which permits the escape of flatus and facilitates operative exposure. The small dose of drug is so placed to obtain the maximum of anesthesia with the least generalized toxicity. The fall in blood pressure occurs early in the operation, when the patient is best able to withstand it. The mucous membranes are not irritated as with ether, and postoperative vomiting is reduced to a minimum. The incidence of postoperative pulmonary complications is reduced. The method may be used for patients requiring emergency surgical procedures in whom slight infection is present in the upper part of the respiratory tract. Fluids can be administered by mouth earlier than following a general anesthetic.

Technically, the method of administration usually is fairly easy, but precision and dexterity must be acquired to obtain uniform results. The equipment necessary is standardized and easily procured.

Spinal anesthesia has its limitations. It is applicable in operations below the diaphragm and preferably below the umbilicus. The patient is awake and may fail to coöperate. Faulty technic in administration is more obvious than with a general anesthesia. With the use of procaine there is a definite limit to the duration of anesthesia and a general anesthetic may be required to complete the operation. The complications mentioned may occur during and following operation.

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## POTASSIUM THIOCYANATE IN HYPERTENSION

Thiocyanates resemble iodides in their therapeutic effect, but they do not affect the thyroid gland. As with iodides, the action of thiocyanates can not be satisfactorily explained. The reduction of blood pressure is dependent on the dose. The small dose of 0.1 Gm. (1½ grains) three times daily frequently fails to produce an appreciable reduction. The large dose, 0.3 Gm. (5 grains) three times a day, reduces blood pressure in a majority of cases but it is so liable to produce untoward results that such patients must be under careful supervision. The Council on Pharmacy and Chemistry has refused admission of potassium thiocyanate to New and Non-official Remedies because it considered the evidence for the drug's therapeutic value inconclusive and published a report giving the limitations of therapy with this drug. (Jour. A. M. A., February 21, 1931, p. 632.)

## W. H. Y.

This product has been described by its exploiters, the Bartlett Nu Products Corporation, Azusa, Calif., as a "100 per cent pure, concentrated food beverage." G. M. Bartlett, President, Treasurer and General Manager of the corporation, claims to be the "discoverer" of the formula for W. H. Y., the ingredients of which are said to be extracts of raisins, figs, walnuts, peanuts, barley, wheat and celery. In 1928 a Notice of Judgment was issued against W. H. Y. because of the false and fraudulent claims contained on the trade package. However, Mr. Bartlett has apparently continued to make equally false and fraudulent claims in such advertising as does not go with the trade package. As W. H. Y. was sold through the United States mails, this brought Mr. Bartlett in conflict with the postal authorities, who have declared the exploitation of W. H. Y. fraudulent and debarred it from the mails. (Jour. A. M. A., March 21, 1931, p. 967.)

# OBSERVATIONS ON SEROTHERAPY IN SCARLET FEVER*

ALEXANDER STEWART, M.D.
*Saint Paul*

SINCE the introduction of commercial scarlet fever antitoxin five years ago numerous reports on the results of this treatment have been published. Some of these reports have been very favorable as to the lowering of temperature, alleviation of symptoms and reduction in the percentage of complications and mortality. Cushing,[1] in 1926, reported a mortality rate of only 1.1 per cent, and a reduction of complications by 25 per cent in those treated by antitoxin over the untreated cases the previous year. In a series of cases reported by Platow and Collins,[2] the rash disappeared, the temperature returned to normal, and the symptoms were alleviated from one and one-half days to two days sooner than in the untreated controls. The Dicks,[3] in a group of 100 cases, report nineteen complications in the untreated and four in the treated. Doolittle[4] had 18 per cent complications in the treated, compared with 23.3 per cent in the controls.

Other reports comparing the treated with those untreated with specific sera have not shown any appreciable beneficial results from the use of scarlet fever antitoxin. Toomey and Dolch[5] made an analysis of 1,658 scarlet fever cases occurring in the Cleveland City Hospital and found the mortality rate very low in the untreated cases.

I have been using antitoxin in scarlet fever patients, both on my service in the contagious hospital and in private practice, ever since it has been available, and I thought it might be interesting to analyze the results of its use.

Of the cases occurring before the opening of the new contagious department at the Ancker Hospital, and in private practice, I have no complete histories, so I have confined this study to only those cases that occurred in my service in the new Contagious Hospital in 1928 and 1929.

The first serum used in the treatment of scarlet fever was convalescent serum, and was first used by Weisbecker and Von Lyden in 1897 with doubtful results.[6] Later the method was made more effective by the work of Reiss and Jungman in 1912.[7] They collected blood from scarlet fever cases at the end of the third or fourth week, removing 100 to 200 c.c. from the veins of adult patients, and then obtained the serum by centrifuging. The pooled serum of at least three donors was placed in sterile ampules and kept in a cool place and was used for the toxic cases only.

In this country Zingher made use of whole convalescent blood, which he injected intramuscularly.[8]

My experience with convalescent serum has been limited to a few cases and has been confined exclusively to whole blood given intramuscularly. In some of the toxic cases I obtained a reduction in temperature and toxicity, but not nearly the marked improvement that we see following the use of the present scarlet fever serum.

For the last five years we have been using commercial antitoxin. At first the serum was so bulky and unconcentrated that we had difficulty in its administration, and had many severe serum reactions. Since then there has been a gradual refinement of the serum so that now the same units of antitoxin are furnished in one-fifth the quantity of serum, and we have much fewer and much less severe reactions.

Antitoxin has been used in the treatment, prophylaxis and diagnosis of scarlet fever.

## ANTITOXIN IN THE TREATMENT OF SCARLET FEVER

During the last two years we have administered antitoxin to thirty-four severe septic or toxic cases of scarlet fever. We have not used antitoxin in the mild cases, as our previous experience in the old Contagious Hospital had shown that we did not obtain results from its use in the mild cases and that the serum sickness which followed often was worse than the disease itself.

*Thesis presented before the Minnesota Academy of Medicine, November 12, 1930.

In all cases in which we used antitoxin in the first three days of the disease the results have been gratifying; some have almost been spectacular, others showed a moderate to a marked improvement in twenty-four hours.

### ILLUSTRATIVE CASES

A. Those treated early before the fourth day of the disease:

*Case 1.*—G. B., aged sixteen years, entered the hospital on the third day of the disease with a temperature of 104 and pulse of 140. A generalized eruption was present over the entire body. The patient was toxic and the throat very congested. On admission 150,000 skin test doses were administered. In twenty-four hours the temperature was 99.2 and the rash almost faded. Uneventful recovery without complications followed.

*Case 2.*—T. H., aged seven years, entered the hospital on the second day of the disease with a temperature of 105 and pulse of 130. A moderately severe rash was present but the patient was very toxic and delirious. On admission 150,000 skin test doses were administered. In twenty-four hours the rash was fading, the throat much improved and the temperature 101. The patient made an uneventful recovery and left the hospital on the twenty-fourth day.

B. Those receiving antitoxin after the fourth day:

*Case 1.*—P. N., aged 22 months, entered the hospital on the fifth day of the disease with a temperature of 105.6 and a pulse of 140. The rash was fading but the patient was very toxic with a septic throat. At once 150,000 skin test doses were administered. Examination twenty-four hours afterwards showed not much change in the throat, but the temperature had dropped to 102. A bilateral suppurative adenitis developed which required incision and healed in three weeks.

*Case 2.*—C. S., aged six years, entered the hospital on the sixth day of the disease with a temperature of 106 and pulse of 140. The patient was delirious and had a septic throat with marked adenitis. Twenty-four hours after the administration of 300,000 skin test doses the temperature was reduced to 100, but the patient remained delirious. Blood culture taken at this time showed a hemolytic streptococcus, and the patient died three days after entering the hospital.

### COMMENT

These four cases typical of our series are presented to show the uniformly good results obtained from the administration of scarlet fever antitoxin early in the disease, and the varied and indefinite results if administered after the third day.

In the group treated before the fourth day there were no deaths. Complications that were not present on admission occurred in only 7 per cent of the cases, and these were either otitis media or adenitis.

Serum sickness occurred in 23 per cent of our cases receiving antitoxin.

On account of the universal use of diphtheria toxin-antitoxin, we have made it a routine procedure to first administer 0.5 c.c. of the antitoxin subcutaneously to desensitize the child, and if there is no reaction to follow in two to four hours, with the rest of the dose.

Of the patients who received 0.5 c.c. of antitoxin subcutaneously, only one had anaphylactic shock, a boy who never had had toxin-antitoxin and on whom we had tried the blanch-extinction test to establish our diagnosis.

In our experience we have never been able to demonstrate any relationship between the degree of anaphylactic shock and serum sickness, and the previous administration of toxin-antitoxin. If we found that we were getting more than the normal amount of serum sickness, investigation showed it to be due to some quality in the serum used, generally that it was not properly aged.

### ANTITOXIN IN THE PROPHYLAXIS OF SCARLET FEVER

My experience with scarlet fever antitoxin in the attempt to develop a passive immunity in cases exposed to scarlet fever has been confined exclusively to private practice.

As a whole, my experience has not shown antitoxin to be satisfactory. In some cases it has not developed an immediate immunity and the exposed individual has developed scarlet fever; others may have developed a short immunity but contracted the disease within one year. The most objectionable feature was the serum sickness which followed. Some of these reactions were mild, but in many instances the patient suffered more than he would have if he had developed the disease. In two instances the reaction was extremely severe; in one the patient died. This was a girl of four years who was exposed to her sister who had a very mild or suspicious case of scarlet fever. A prophylactic dose of antitoxin was administered by the family physician. On the fifth day after receiving the antitoxin she developed an urticaria with adenopathy and toxemia. This became steadily worse until death oc-

curred on the tenth day. A very exhaustive postmortem examination revealed nothing but a general adenopathy, especially of the pelvis and abdomen.

We believe that no definite evidence has developed from our experience to justify the use of scarlet fever antitoxin to develop a passive immunity; in fact, several biological houses have withdrawn the prophylactic dose from the market.

### ANTITOXIN IN THE DIAGNOSIS OF SCARLET FEVER

The Schultz-Charlton reaction or blanching test has been a definite aid in diagnosis of some doubtful cases of scarlet fever.

The reaction is brought about by the intradermal injection of 0.5 c.c. of scarlet fever antitoxin where the rash is well marked, such as on the chest, abdomen or thigh. Twenty-four hours afterwards, if the case is scarlet fever, a blanching of the skin around the site of injection occurs.

Before the advent of antitoxin we used convalescent serum, but the reaction was not always so striking.

This test will not help a great deal in the mild cases, because we must have a distinct rash to bring out the reaction, but it has been a definite aid in differentiating erythemas and drug rashes from scarlet fever.

### SUMMARY AND CONCLUSION

I appreciate the fact that thirty-four cases is a very small group from which to draw any definite conclusions as to the value of scarlet fever antitoxin as a therapeutic agent, and that many cases have to be treated before we know its exact value; also that during these two years the city mortality rate was very low. Of 1,188 cases occurring in the city during this period there were only nine deaths, a mortality rate of 0.76 per cent.

We have administered antitoxin to a great many more patients, especially when antitoxin was first introduced. Then it was given almost routinely in hospital and private cases. We have no exact records but the results were similar to this group of which I have made a more critical study.

To offset the mildness of the present type of scarlet fever, we gave antitoxin to only the septic or toxic cases. We have a working rule in the hospital that if the temperature is not over 102.5, or if the patient is not septic or toxic, we will not administer antitoxin.

1. Thirty-four septic or toxic cases of scarlet fever treated with scarlet fever antitoxin in the Contagious Department of the Ancker Hospital, St. Paul, during the last two years were observed. Of these, four representative cases are reported.

2. All patients receiving antitoxin before the fourth day recovered. Only 7.5 per cent developed complications, and these were adenitis and otitis media. Twenty-three per cent of all patients receiving antitoxin had a serum sickness, a few reactions being moderately severe, but the majority mild.

3. We believe that scarlet fever antitoxin is a specific and prompt cure for uncomplicated scarlet fever if given early, and should be used promptly in all cases that are septic or toxic.

4. From our experience with scarlet fever antitoxin as a prophylactic measure we do not feel justified in recommending it as a method of developing a passive immunity; in fact we advise against its use, because: (1) some patients do not become immunized; (2) others lose their immunity in a short time; (3) the reactions in many instances are very severe, one in our experience having proved fatal.

5. In the Schultz-Charlton phenomenon or blanching test we have a distinct aid in differentiating scarlet fever from erythemas and drug rashes. The test is not of much help in the diagnosis of mild cases in which there is only a slight rash.

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# CONGENITAL HYPERTROPHIC PYLORIC STENOSIS*

OSWALD S. WYATT, M.D., F.A.C.S.
Instructor in Surgery, University of Minnesota
*Minneapolis*

THE clinical entity of congenital hypertrophic pyloric stenosis has been recognized for a good many years. As early as 1777 Armstrong described the necropsy findings of a case.

H. Beardsley reported the first case in this country in 1841. He described the clinical and necropsy findings in the fifth year of life, symptoms being present in the case from infancy. He noted that "the pylorus was invested with a hard compact substance, or schirrosity, which so completely obstructed the passage into the duodenum, as to admit with the greatest difficulty the finest fluid. The stomach was unusually large and about the thickness of a hog's bladder."

Siemon and Dawosky reported the first case in Germany in 1842 and for the first time called attention to the projectile type of vomiting. Both of these men attributed the stenosis to hypertrophy of the submucosa.

Landerer in 1879 first used the term "congenital pyloric stenosis."

Hirschsprung in 1887 and 1888 presented the clinical findings and created modern interest in this disease of infants. He considered the condition as a primary developmental hyperplasia.

Finkelstein first called attention to the palpable tumor in 1896. Cordua in 1893 reports that the early operations performed were jejunostomy. Later Stiles reports resection of the pylorus and Loreta performed pyloric divulsion through a gastrostomy. None of these operations were generally successful.

Dr. Edmund Cautley in the British Medical Journal for 1898 reported a death in the fifteenth week from vomiting and marasmus. Another infant died in the eighth week. He noted the characteristic symptoms about as described at present. All his reports were of postmortem findings. He noted that symptoms usually began within the first month. In two cases the tumor had been noted during life. Regarding etiology, he suggested that it might result from a redundancy of fetal growth, due to the anxiety of nature to provide an efficient pyloric sphincter. Rolleston, in discussing this paper, said that pylorectomy was the form of surgical treatment most likely to be successful.

In the same year Willey Meyer and Stern reported a case in which a gastro-enterostomy was done. Also in 1898 Lobker reported the first successful enterostomy. This was the operation of choice for nearly fifteen years.

Heinecke-Mikulicz devolved the first pyloroplasty. In 1907 Fredet performed the first successful submucous pyloroplasty, suturing a longitudinal incision transversely. In 1910 Weber performed the same procedure as Fredet, calling it partial pyloroplasty.

As late as 1912 Rammstedt advised omission of the transverse sutures of Fredet and advised leaving the pyloric wound gaping. This operation of Rammstedt's is today accepted as routine surgical treatment for these cases.

## ANATOMY

The normal pylorus in infants is a cylinder about 1.5 cm long. The lumen is usually obliterated by folds of mucous membrane. The pylorus has a powerful sphincter containing both circular and longitudinal muscle fibers which are greater here than in any other portion of the stomach. Longitudinal muscle fibers which radiate from the esophagus and pass over the stomach end before they reach the pylorus. A new set of longitudinal fibers arise on the walls of the stomach which form the longitudinal coat for the pylorus. Very few of these fibers pass over into the muscular coat of the duodenum. The deeper longitudinal fibers penetrate the pyloric sphincteric ring. This apparatus is antagonistic to the pyloric sphincteric ring. Thus the ring has a dilator and a constrictor muscle.

## ETIOLOGY

In at least 50 per cent of cases the firstborn child is the one affected. Boys suffer from this affection more than girls in the proportion of 8 to 1. Just what is the explanation of the mus-

*Thesis presented before the Minneapolis Surgical Society October 2, 1930.

cular hypertrophy which is responsible for the obstructive symptoms is a problem. Hirschsprung and Cautley advanced the theory that there is a primary congenital muscular hypertrophy in the affected region, and that this is associated with a secondary increased functional activity, the combination resulting in a pyloric obstruction.

Thomson maintained that a functional overactivity of the muscle is the primary factor, that the functional error depends upon a want of coordination of the normal stimuli, and that the repeated forceful contractions of the muscle result in a secondary hypertrophy.

Holt believes that hypertrophy precedes spasm and continues long after the spasm has ceased. Most observers believe there is a certain amount of spasm also present. The relation of hypertrophy and spasm to symptoms remains in chaos.

Still believes that there is a congenital lack of stability in the harmony of gastric and pyloric relaxation and contraction. Another theory assumes that hypertrophy is primary and spasm secondary.

Downes and Bolling believe that there is a primary developmental hyperplasia of the circular muscle layer of the pyloric canal. They are also of the opinion that hypertrophy always precedes spasm, but that not until spasm has been added do symptoms appear. Likewise, they state that the severity of symptoms is dependent upon the degree of spasm and the amount of obstruction caused by the hypertrophy. They believe there is apparently no relationship between the severity of the clinical symptoms and the size of the tumor.

Dent, Greenbaum and MacHaffie consider the hyperplasia congenital because the condition has been noted in a seven months fetus, and in several instances a few hours after birth. Associated with the hyperplasia is a secondary increased functional activity, the combination resulting in pyloric obstruction.

Whichever view is accepted we must appreciate that the obstruction results from the increased bulk of the muscular fibers and the powerful contractions of the hypertrophied muscle.

### PATHOLOGY

The muscular hypertrophy extends proximally from the level of the pyloric veins along the stomach wall to the region of the incisura angularis. The hypertrophy stops almost abruptly at the first portion of the duodenum. The hypertrophied pylorus has the appearance and feel of a solid tube about 3 cm. in length and varies from 1 to 2 cm. in thickness. In shape it resembles an olive. The consistency is almost that of cartilage and the color is whitish-pink. On section the thickening is found to be due to a hyperplasia of the circular muscle layer. The submucosa is usually edematous; the other layers are unchanged. Fraser believes that the circular pyloric sphincter is not affected by the hypertrophy. The tumor is smooth, glistening and usually freely movable. The amount of hypertrophy and dilatation of the stomach depends upon the stage of the disease and the degree of obstruction.

### SYMPTOMS

A previously healthy, breast-fed infant begins to vomit, apparently for no reason, and usually between the second and fourth week. The vomiting persists, becomes forceful and finally projectile. The vomiting usually occurs right after the feeding, but may occur while the infant is at the breast. The amount of vomitus usually represents the entire stomach content. Vomiting may not be present after every feeding but when it does occur the vomitus, if measured, will be found to be greater in amount than the last feeding. The vomiting is unaccompanied by fever and the appetite is unimpaired. Such characteristic vomiting is rare after the sixth week, but I have operated once where the vomiting began in the eighth week and have seen one performed when it began in the sixteenth week.

If the child presents emaciation and dehydration of a moderate degree, gastric peristalsis is visible and in about 50 per cent of instances a tumor is palpable. Frequently the gastric outline is visible before the waves start; then one, two or even three waves may be seen passing across the stomach. The waves simulate a golf ball passing under the surface of the abdomen.

Various authors place different valuations upon the palpation of the tumor as a diagnostic sign. Surely palpation of the tumor is a valuable diagnostic sign, but I do not believe that one should wait for a palpable tumor before making a diagnosis and deciding upon operation. Bolling believes that it is the most important sign and, if sought in the proper manner, can be felt every time. If the abdomen is pal-

pated while the child is feeding, the pylorus can be felt usually just above the umbilicus, sometimes up under the liver and occasionally just below the ensiform process. Bolling, in 611 cases, felt it in all but two cases and only in three cases was the pre-operative diagnosis incorrect. Personally, I have not been able to palpate the tumor in over 50 per cent of cases. If an operation is undertaken and no tumor found, certainly no operative procedure should be carried out on the pylorus.

The secondary symptoms, such as constipation, scanty urine and weight-loss, are merely the result of vomiting. The weight chart is all-important. One infant we observed in the hospital for twelve days, during which time it just held its weight; then it began to lose and an operation was done. The rate of weight-loss is an excellent guide as to the severity of the obstruction. In severe cases the loss will be 50 to 100 gm. per day and if allowed to go from two to six weeks death will usually occur. If the disease has lasted for more than four months the infant will usually recover.

### DIAGNOSIS

With the above clinical picture in mind, the diagnosis should be relatively easy. Projectile vomiting, visible gastric peristalsis and palpable pyloric tumor are found in no other condition in infants. The use of the X-ray is not necessary for a diagnosis and yet occasionally in doubtful cases it will be of value. In one case observed there was such a severe cardiospasm with dilated esophagus that pyloric stenosis was simulated, and only by the aid of the X-ray were we able to make a differential diagnosis. When vomiting occurs from birth the X-ray is of aid in ruling out congenital malformations of the duodenum and esophagus.

### TREATMENT

The medical management in case of pyloric stenosis consists of one or more of the following: atropine, breast-feeding, gastric lavage and thick cereal feeding. I feel that except in desperate cases a fair trial on medical management should be given. By this I mean an infant in fairly good condition under a pediatrist's care and holding its weight should be given a week or ten days' trial. I do not believe that such treatment should be persisted in if the baby is losing ground or if we have to take it away from the breast. No medical treatment is a substitute for breast milk.

Holt states that non-operative cases show no symptoms after the first year; yet there is the possibility that the condition predisposes to pyloric obstruction in later life.

Strauss maintains that if 80 per cent of the meal has passed through the pylorus in four hours the child does not need an operation. In ten years he has never operated upon a three to four day old infant because in every case, if these infants were kept on the breast for ten days, the symptoms disappeared. These he maintains are cases of pylorospasm and not true hypertrophy. I doubt whether we are justified, in order to avoid an operation, in permitting these infants to lose so much weight at such a critical period in their development that it takes six months to get them back to normal.

### PROGNOSIS

The prognosis depends entirely upon the factors present at the time of operation, the preoperative preparation, the post-operative care and the experience of the individual surgeon.

Gladbloom and Spence, studying the records of 163 cases of Bolling, Downes, Holt and Kerley, concluded that: "When symptoms have lasted less than four weeks, the mortality is only one-third as great as when they have lasted four weeks or longer.

"The mortality in artificially fed babies is more than three times that for breast-fed babies.

"In infants weighing 7 pounds or less the mortality was three and a half times as great as in those who weighed more than 7 pounds.

"The mortality increases in direct proportion to the amount of weight lost previous to operation.

"The mortality for breast-fed infants who vomited less than four weeks and who had lost less than 20 per cent of their best weight is almost nil."

Bolling and Downes say this should be less than 3 per cent. In 611 cases they had a mortality of less than 4 per cent and have had a consecutive run of fifty cases without a death.

Babies in fairly good condition after operation are usually out of the hospital in ten to fourteen days.

### PREPARATION FOR OPERATION

The proper pre-operative care of these infants is extremely essential for the success of this operation and should always be cerried out in conjunction with a pediatrist. There is no emergency about this operation and infants in poor condition should be given two to three days of pre-operative preparation. Dehydration should be taken care of by enteroclysis and hypodermoclysis of normal saline. Remember that interoclysis is not tolerated well by infants. Intravenous administrations of glucose solution (3 to 5 per cent) should be given in suitable cases. The day preceding operation as much as 10 to 15 ounces may be given in divided doses. Matill and his co-workers demonstrated that the glucose tolerance of these atrophic infants is considerably raised. They found that "the glucose tolerance of the approximately normal infant, as determined by the Woodyatt method, is very likely identical with that of the normal adult, which is 0.8 to 0.9 gm. per kilogram per hour.

"The tolerance of atrophic infants for glucose is considerably greater, varying from 1.4 to 1.8 gm. per kilogram per hour." The body heat should be strictly maintained and transfusions resorted to if deemed necessary, giving 50 to 75 c.c. only at one time.

Before beginning the operation, the infant should be wrapped in cotton batting, the stomach should be evacuated by means of a catheter and the operating table should be warm. Some prefer operating under ether anesthesia; others under local. I feel that when the baby is in good condition general anesthesia is the choice, but when the risk is poor local anesthesia is advisable.

### OPERATION

The operation devised by Rammstedt is the one of preference because it is simple, quick and gives excellent results. An upper right rectus incision is made about 3 inches long, which, upon opening the peritoneal cavity, will usually lie over the lower border of the right lobe of the liver. The stomach, which usually presents, is followed along to the plorus, which is delivered through the wound. The hypertrophied pylorus is held between the thumb and forefinger of the left hand. Beginning at the duodenal end of the tumor an incision is made through the bloodless area on the anterior surface. This incision must extend through the peritoneum and superficial muscle fibers across the entire pylorus and slightly up on the stomach wall. Then with a forceps the wound is spread and the muscle fibers torn, first at the stomach end, working down to the duodenal end. The spreading process is continued until the mucosa throughout the entire length of the wound bulges flush with the peritoneum. If the tearing process is maintained at the duodenal end of the wound until the tear begins to circle the duodenum then you are absolutely certain that all the fibers have been torn and none have been overlooked. The transition from hypertrophied pyloric muscle to stomach muscle is gradual and there is little danger of tearing the mucosa at this point. On the other hand, the transition at the duodenal end is abrupt and the greatest caution must be exercised or a perforation of the mucosa will result.

If any bleeding is present it can usually be controlled with hot packs; if not, a fine silk ligature or muscle transplant can be used. It is unnecessary to attempt to cover the wound with omentum. The pylorus is dropped back into the abdominal cavity and the abdominal wall is closed in layers without drainage. Several silkworm sutures are used to prevent post-operative evisceration.

Mixter states that the conservation of body heat and the avoidance of rough handling must be impressed upon the entire hospital staff. Also that speed, gentleness and hemostasis are the essentials for a successful operation.

### COMPLICATIONS

Accidental opening of the lumen of the pyloric canal is no doubt the most severe complication of this operation. The mucosa may be opened by cutting, but occasionally it is torn open. I have been fortunate enough never to have cut it, but I have torn it open at the duodenal end of the wound. It is well to remember that the duodenal end presents the abrupt change from hypertrophied muscle to normal muscle and this is the point where the accident is most likely to occur. If this accident should occur, the opening should be sutured with fine silk. Sometimes a small perforation may be overlooked and close scrutiny is necessary. An overlooked perforation means peritonitis and usually death.

Hemorrhage is rare, but with the usual surgi-

cal caution regarding hemostasis it should give no trouble.

Post-operative hernia should not occur if the abdominal wall is closed carefully in layers and several silkworm stay sutures used. Contamination of the dressing should be prevented to avoid wound infection.

### POST-OPERATIVE CARE

To my mind, the post-operative management in these cases is by far the most important part of the entire procedure and should be done in strict coöperation with a pediatrist.

The head of the bed should be lowered for several hours and body temperature maintained with care. A teaspoonful of castor oil given after twenty-four hours relieves gas and mucus and makes the baby more comfortable. Vomiting during the first twenty-four hours is relieved best by posture and the stomach tube. Hypodermoclysis should be given freely during the first twenty-four hours. Chloral hydrate is excellent to keep the infant quiet during the first twenty-four hours. Water may be given by mouth two to three hours after operation, and diluted breast milk after three to four hours. If the condition of the child permits, it may be returned to the breast in three to four days.

If small frequent feedings are given, the baby as a rule will have no more vomiting. The feeding should be increased about 10 c.c. every day until the required amount is reached. If larger feedings are started, usually the baby will vomit about four times the first day, three the second and so on until the fifth or sixth day, when vomiting ceases. The usual hospital stay is about ten to sixteen days.

### RESULTS

Regarding the results of the Rammstedt operation, I am qualified to speak only from a clinical point of view. All of the infants upon whom I have operated have made uneventful recoveries.

Pathological studies of this condition have been made by Martha Wollstein of the New York Babies Hospital, who reports as follows:

"Healing is brought about by the cells of the serosa and submucosa, but the unstriped muscle cells take no part in the process.

"The wound in the pylorus is healed in nine days. The pylorus has become relaxed within two weeks. The stomach has returned to its normal size within a month, and the gap between the cut ends of the muscle coats has practically disappeared in six weeks. In two years, only a line of connective tissue fibers separates these two muscle ends and the stomach is quite normal.

"In contrast to the operation of gastro-enterostomy, which leaves the pylorus unchanged, the Rammstedt operation cures the pyloric lesion."

Bolling and Downes have followed some of their cases fourteen years and none of them have shown any evidence of pyloric obstruction or any symptoms referable to the operation. They conclude that careful analysis of operative results proves that there is no interference with normal physiological development.

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## THE CONTROL OF NARCOTIC ADDICTION

Narcotic addiction is again the focus of an extraordinary amount of attention. The results of investigations concerning the subject are being made public. The taking of narcotics is usually an attempt on the part of some one with little will power to achieve a state of euphoria or artificial happiness. The addict finds withdrawal accompanied by exceedingly unpleasant symptoms and tends to succumb again. Apparently it is possible for an experienced physician to carry an addict through the withdrawal period with relatively little distress. The importance of narcotic preparations should not be under-estimated. Nevertheless there exist in medicine innumerable occasions when one or more of the relatively non-habit-forming sedatives, narcotics, hypnotics and analgesics may be employed to substitute for an opium derivative. A series of articles is to be published in an effort to indicate the relatively few instances demanding the administration of opium or cocaine derivatives and the many available substitutes. It is estimated that under twenty-five per cent of narcotic addiction results from prescriptions by physicians in cases in which such prescribing may not have been absolutely necessary. The physician must try to limit his prescribing of narcotics absolutely to those situations where they are indispensable. The medical use of narcotics in the United States appears to surpass that of any other nation. Efforts are being made to limit the prescribing of narcotics to those instances where their use is indispensable. (Jour. A. M. A., March 14, 1931, p. 862.)

# CASE REPORTS

## HYPERTHYROIDISM COMPLICATING DIABETES MELLITUS*

R. C. Webb, M.D., F.A.C.S.
Assistant Professor of Surgery, University of Minnesota
*Minneapolis*

Hyperthyroidism is a disease which fascinates physicians and surgeons extremely. The diagnosis has become very well understood and the treatment though empiric is relatively standardized. The etiology, however, is still obscure. Diabetes mellitus has become more interesting since Banting gave us insulin and both patient and physician find satisfaction in its control. In hyperthyroidism the disturbance in metabolism is that of an increase where the flame of life is excessively fanned. In diabetes mellitus metabolism is impaired due to lack of secretion of another important gland. When these two diseases coexist we find an extremely fascinating situation which is illustrated in the following case report.

Mrs. C. S. was admitted to the Asbury Hospital on July 26, 1928, under the care of Dr. T. A. Peppard. She was thirty years of age, weighed seventy-eight pounds and was five feet, one and one-fourth inches tall. Her occupation was housewife.

She complained of weakness, palpitation, dyspnea on exertion, a good appetite with loss of weight and frequency of urination.

In March, 1927, she had had a cesarean section performed. There had been two previous pregnancies in which the baby had died shortly following birth. She had not felt well during the past fifteen months. Her present complaints began three months before admission following an attack of influenza. Her heart began to beat fast. She became short of breath on exertion and she had been getting progressively weaker and had lost eighteen pounds in weight. Her appetite was very good but she did not get enough to satisfy her. She drank large amounts of water. Her past history was unimportant and her family history was entirely negative.

On physical examination she was found to be a poorly nourished individual with enlarged tonsils, a normal sized but palpable thyroid and a slightly enlarged heart and a lower midline abdominal scar. Her blood pressure was normal and the pulse rate was from 100 to 110 on admission. She was found to be excreting 11 grams of sugar in twenty-four hours when on a diet consisting of 35 grams of carbohydrates, 35 grams of protein and 120 grams of fat. Her blood sugar was .176 and the carbon-dioxide combining power was 58 volumes per cent. The basal metabolic rate was found to be plus 63.

The glycosuria was easily controlled and she became sugar-free after three days of hospital treatment and the blood sugar was normal on the seventh hospital day. She was given Lugol's solution and her diet was increased. On August 8, 1928, the basal metabolism rate had fallen to plus 37. The diet was increased until she started to show sugar, when it was reduced and then increased again and she remained sugar-free with a maximum intake of food. During a period of seven days she was given from 10 to 27 units of insulin daily but otherwise her diabetic condition was controlled by dietetic measures.

On September 7, six weeks after admission and after having been treated with Lugol's solution, she was referred to the writer for operation and a partial thyroidectomy operation was performed. The amount of gland tissue left was estimated as being about the equivalent of one-fourth of a normal lobe. The pathological report showed a lymphocytic infiltration in a few areas, indicating previous activity, but otherwise showed the condition found in hyperthyroidism brought back to normal by treatment with Lugol's solution. Following the operation Dr. Peppard found it necessary to use as much as 50 units of insulin and five days after operation she was constantly sugar-free. Her weight was the same upon admission and she was taking a diet of 48 grams of protein, 98 grams of carbohydrate and 55 grams of fat with a caloric value of 2,000. The basal metabolism on September 24, 1928, was found to be plus 31. A year later, however, on September 10, 1929, the basal metabolic rate was plus 17.

She was discharged from the hospital on September 24, 1928, and at home kept constantly sugar-free, maintaining her weight, and did not need to take insulin.

On July 15, 1929, she developed some furuncles and a rightsided abdominal pain which was diagnosed as appendicitis. On August 7, 1929, she started to vomit, became dizzy, confused and stuporous and was brought into the hospital on August 8, 1929, under the care of Dr. Peppard, suffering from diabetic coma. She was given active treatment and after three days became sugar-free. She was found to be suffering from an acute pyelitis of the right kidney. The diabetes was again controlled and she left the hospital on September 11, 1929, in good condition but requiring insulin in small amounts. She had been getting along very well for one year following thyroidectomy, controlling her diabetes by diet alone until she developed an acute infection which brought about a diabetic coma. After control of the diabetes, her basal metabolism was found to be plus 17 and she was found to require a small amount of insulin.

Subsequent report.

On January 4, 1931, the patient wrote a letter saying

*Presented before the Minneapolis Surgical Society January 6, 1931.

that she had gained thirty-seven pounds and now weighs one hundred fifteen pounds and is actually fat. She has no nervousness or tremor and as far as she knows has no goiter trouble. She does her own housework. She is still taking insulin and requires seven units three times a day in order to remain sugar-free.

DISCUSSION

Carnot and Rathery writing in 1912 on Thyroid Hyperplasia in Diabetes reported four cases all with autopsy reports.

Sainton and Gastaud discussed this subject in 1913. They credited Dumontpallier with the first published case in 1847. At that time sixty cases had been reported in the literature where severe diabetes complicated hyperthyroidism. The prognosis was considered grave. Tuberculosis often appeared as a later complication.

Parhon and Nitzulesco in 1926 reported a patient who had an enlarged thyroid without other symptoms. A physician prescribed treatment and the thyroid diminished in size but the patient developed weakness and hunger and thirst and was found to have diabetes mellitus with exophthalmus. The patient was not given surgical treatment and was unable to buy insulin and death ensued in a short time. These authors believed that the treatment for the goiter aggravated the diabetes. It is probable that this goiter was non-toxic and would have had no influence on the diabetes had it been left alone.

In a study of thirty-eight cases of frank diabetes complicated by hyperthyroidism, Wilder in 1926 found that an inconspicous diabetes may be fanned into flame by hyperthyroidism and the insulin requirement is increased. The intensity of the diabetes is reduced by Lugol's solution, paralleling the basal metabolic rate. Thyroidectomy was almost always followed by a gain in tolerance in the diabetes and there were no deaths in the series. In adenomatous goiter with hyperthyroidism, iodine was found to have little or no influence on the course of the diabetes.

Orator in 1927 reported a case of hyperthyroidism and diabetes where insulin therapy had no effect on the diabetes but after thyroidectomy the sugar content of the urine decreased steadily until the patient developed a tolerance of fifty grams of dextrose.

Coller and Huggins in 1927 reported twelve cases from the University of Michigan Hospital treated by operation with one death. Eleven of the patients had adenomatous goiters. In one case following operation the patient developed respiratory difficulties and an emergency tracheotomy was performed. The respiratory difficulties were not relieved, however, until glucose and insulin were given.

SUMMARY

Thyroidectomy will produce a "cure" of the hyperthyroidism when complicated by diabetes mellitus and renders the diabetes easier to handle and at times results in great improvement in carbohydrate tolerance.

Glycosuria frequently occurs in hyperthyroidism and may indicate the presence of a true diabetes. When true diabetes exists the cooperation of surgeon and internist is positively required. Coma may result as a post-operative complication of thyroidectomy when diabetes is present and may be mistaken for tracheal obstruction.

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## PACHYMENINGITIS HEMORRHAGICA INTERNA

REPORT OF CASE WITH RECOVERY

ROBERT ROSENTHAL, M.D.
*Saint Paul*

Pachymeningitis hemorrhagica interna in infancy is a rather rare disease, and has a high mortality (60 per cent). It seems therefore justifiable to report a case which presented several interesting features and ended with recovery.

*History.*—The patient, a boy five and a half months old, was admitted to the hospital December 31, 1930.

The mother was in the hospital with tuberculosis, but the patient apparently was not exposed, as he was separated from the mother shortly after birth. The family history is negative otherwise.

The patient was born prematurely (7 months), weighing 5 pounds and 2 ounces. After an initial loss of almost 1 pound he began to gain in weight and was getting along quite nicely. A Mantoux test at twenty-one days of age was negative, as were also a Pirquet test and a second Mantoux four days later. About the middle of December his skin began to show a yellow tinge; this gradually became worse. The stools always had a normal color. At the same time the child began to perspire profusely about the head and slept poorly. The child was taken to a hospital in Minneapolis and stayed there for two weeks. The hemoglobin was found to be 22 per cent on admission and after an intraperitoneal blood transfusion it went up to 30 per cent.

The child never attempted to sit up and the father thought that such attempts caused pain. He also thought that the child's head had been large since birth, although the attending doctor called it normal at the time of delivery and no abnormality was observed on examination at the age of three weeks.

Feedings: Expressed breast milk was fed for the first five days. Since then the child has been artificially fed. Previous to admission he received a formula containing 1,000 c.c. of milk, 250 c.c. water, five tbsp. dextri-maltose. Cereal was fed three times a day. Viosterol MX in orange juice also was given three times a day.

*Physical examination.*—The patient was a poorly

TABLE I

| Date | Spinal Puncture | Cranial Subdural Puncture |
|---|---|---|
| 1/2 | 30 c.c. Clear. Pressure increased. Occasional Lympho. Glob. ft. tr. R. B. C. present (traumatic). Sugar 0.11 per cent. Wassermann neg. Colloidal gold, 0011110000. | |
| 1/5 | 3–5 c.c. Clear. Normal pressure. | |
| 1/8 | | Dark brown, about ¾ blood and ¼ spinal fluid. 10 or 11 c.c. High pressure. Fluid browner than normal blood and does not become clearer on standing. Full of R.B.C., many normoblasts. |
| 1/10 | | Pressure high. Still very bloody. Perhaps a little browner. About 20 c.c. removed. |
| 1/19 | | About 25 c.c. Dark brownish. |
| 1/23 | 5 c.c. Clear. Glob. 0. Cell count, 0. Sugar 0.09. | Blood degenerating. There are still nucleated R.B.C. No evidence of blood pigment. |
| 1/28 | | Fluid still quite brown. Contains much less blood. |
| 2/2 | | The fluid is slightly less brown. Crenated R.B.C.; R.B.C. breaking down. No evidence of blood pigment. The nucleated R.B.C. are more pycnotic. The W.B.C. are large monocytes and lymphocytes. A culture of fluid showed staphyl. alb. (which was considered a contamination). |
| 2/9 | | Yellow. 12 c.c. Cell count 370. P.M.N. 57. Lymph. 43. Few R. B. C. No organisms. Culture neg. |
| 2/14 | 5 c.c. Clear. Cell count 5. Wassermann neg. | Yellow. Cell count 44. Some R.B.C. Colloidal gold: 0±±1111+000. |

nourished infant, weighing 12 pounds, 9.5 ounces. He was very pale, had a waxy color, and cried much.

The head was quite large, the circumference being 47.6 cm. The fontanelle was large, bulging and very tense; the sagittal suture was gaping. There was some cranio-tabes. The eyes were pushed downward, the upper margin of the iris being visible, the lower third being covered by the lower lid (visus hydrocephalicus).

The chest had a circumference of 42.5 cm. and was normal.

There was nothing abnormal about the throat and abdomen.

The nervous system was normal, except for the enlargement of the head and the increased intracranial pressure.

The skeleton showed a rosary, some thickening of the epiphyses, some craniotabes and a hydrocephalic type of head. There was no tenderness of the extremities.

The urine was normal.

The blood examination showed Hgb. 40 per cent, R. B. C. 2,150,000, P. M. N. 43 per cent, Lymph. 52 per cent, Eos. 3 per cent, Trans. 2 per cent, moderate poikilocytosis, marked anisocytosis, moderate polychromatophilia, several normoblasts.

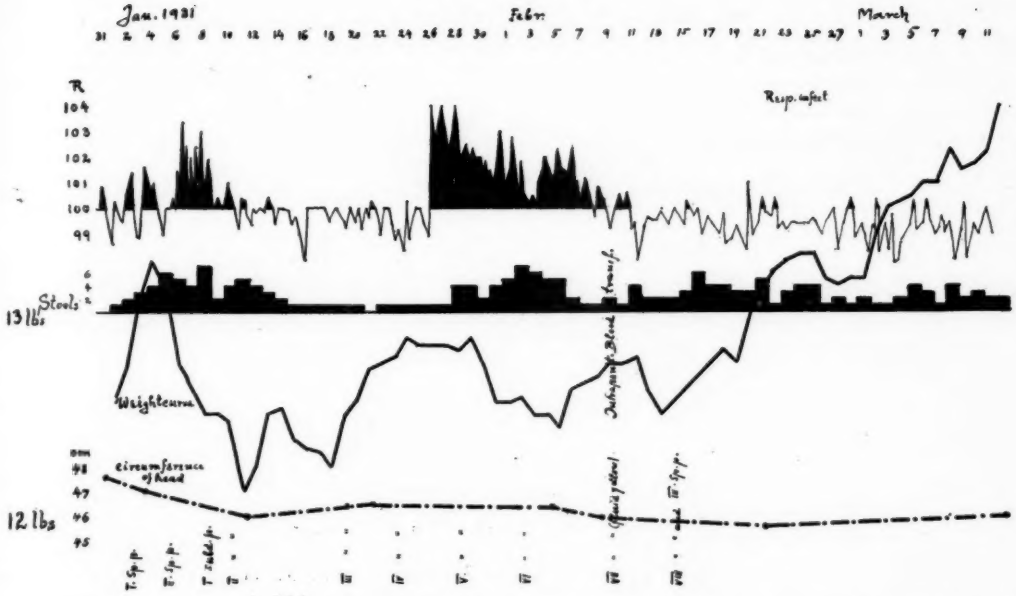
X-ray examination: The head showed thinning of the skull bones and increased separation. The bones of the forearms and legs showed definite changes due to rachitis.

*Course of Disease.*—January 2, 1931. A spinal puncture was performed and 30 c.c. of clear fluid were obtained under highly increased pressure. The fluid was practically normal otherwise (see table). The fontanelle was much less tense after the puncture and was hardly bulging.

January 5. The circumference of the head remained the same and the fontanelle was bulging again; another spinal puncture was done but only about 4 c.c. were obtained. The pressure was not far from normal. After the puncture the fontanelle seemed slightly softer, but was still bulging.

January 8. The child was worse, ate poorly and vomited much. A ventricular puncture was attempted on the left side but no fluid obtained, but on removal of the needle a very bloody fluid gushed out from the subdural spaces. A subdural cranial puncture in the right corner of the fontanelle produced the same fluid, which contained much fresh blood with many normoblasts, but no pigmented phagocytes. On standing the fluid did not become clearer. It was estimated that the fluid contained approximately three-fourths blood and one-fourth spinal fluid, and it was definitely somewhat browner than normal blood. The fontanelle, which was very tense before the puncture, was slightly sunken afterwards. Examination of the fundi revealed "bilateral chorio-retinitis. No hemorrhages of any consequence."

January 10. The child was very pale, listless and drowsy, but vomited less. A second subdural puncture




This chart shows the temperature curve, the weight curve, the curve of the circumference of the head and the number of stools. The response of the intestinal tract to the rise of temperature (parenteral dystrophy) is interesting. The spinal and subdural punctures respectively are given at the bottom of the chart.

was performed and 10–12 c.c. of very bloody fluid removed, which was perhaps a little browner; the pressure was markedly increased.

January 12. The child cried frequently, but began to eat better and vomited only occasionally. The temperature, which had been as high as 103.5 for the past few days, became lower. A blood count showed: R.B.C. 3,140,000, several normoblasts, P.M.N. 24 per cent, monocytes 2 per cent, Eos. 3 per cent, moderate anisocytosis, some poikilocytosis, slight polychromatophilia. The circumference of the head was decreased 1.5. cm.

January 19. Five days ago a decided improvement could be noticed; the patient became brighter and began to eat much better. The temperature was not over 100 for the last four days. A third subdural puncture yielded 25 c.c. of dark brownish fluid. This fluid was decidedly browner, but contained less blood.

January 21. Another examination of the fundi: "No retinal hemorrhage. Marked chorio-retinitis." The fontanelle was not bulging. The circumference of the head remained the same. The bleeding time was 3 minutes, 20 seconds, and the coagulation time 6 minutes, 5 seconds.

January 23. A second spinal puncture was performed and a perfectly normal fluid obtained, while the subdural fluid was still dark brown and under quite high pressure. In general, the child was improving. An X-ray examination of all extremities showed a mild rachitic involvement of the bones, and "there is an area of decreased density just proximal to the epiphyseal line in the right radius, which may possibly be a manifestation of associated scurvy."

January 27. Yesterday the temperature went up again (104 R.) and remained high. The child became very fussy; the examination was negative except for the head findings and rather frequent and loose stools (parenteral dystrophy).

January 28. The subdural fluid remained quite brown, but contained much less blood; the pressure was fairly high.

February 2. The fever was less severe in the last few days. The child had five to six stools a day and dropped in weight. The circumference of the head remained stationary (46.5 cm.) and there was occasional vomiting. The urine contained a trace of bile. A blood examination showed: Hgb. 51 per cent, R.B.C. 2,830,000. The subdural fluid was still brown.

February 7. The child became fussy again. There had been another rise of temperature during the last three days (102.5-103 R.).

February 9. As the child was still very anemic, an intraperitoneal blood transfusion (father's blood, 200 c.c.) was given. The temperature had decreased during the past two days, the stools became better and the child began to gain in weight. The subdural fluid became yellow since the last puncture, but the cell count was fairly high (see table).

February 13. A spinal puncture yielded clear, normal fluid. The subdural fluid (eighth puncture) was light yellow, and the cell count greatly reduced. The blood had slightly improved: Hgb. 53 per cent, R.B.C. 3,220,000, W.B.C. 8,450; Diff.: P.M.N. 44 per cent, Lymph 56 per cent, and the child seemed improved in every way.

Febuary 24. The patient was gaining in weight (12 ounces in last ten days). Occasionally the temperature was slightly elevated (100.5 to 101 R.). The circumference of the head remained stationary; the fontanelle rather sunken. The patient contracted a moderately severe respiratory infection. The hemoglobin was 55 per cent, the R.B.C. 3,580,000.

March 17. The child continued to improve in spite of the respiratory infection and a mild impetigo. The circumference of the head remained stationary; the fontanelle was rather sunken. The hemoglobin increased to 65 per cent and the last R.B.C. count was 3,350,000. The child was still unable to hold up the head. Examination of the nervous system was negative. The physical condition had decidedly improved. The weight had increased rapidly (1.5 pounds in the past month). There were signs of mild rachitis.

COMMENT

On first examination this child appeared to have a hydrocephalus internus until the subdural puncture led to the correct diagnosis. The spinal fluid remained normal throughout the sickness while there was a dark brownish, very bloody subdural fluid over the convexity of the brain which later changed to the typical yellow color. No retinal hemorrhages which are so frequently present in pachymeningitis were found, but there was a chorioretinitis.

The etiology in this case is not clear; no evidence of a severe rhinitis could be found in the history. Whether the severe secondary anemia was caused by the pachymeningitis, or rather was due to the same factor causing the pachymeningitis, could not be ascertained. The peculiar X-ray findings, which make one suspect a mild scurvy, may be of importance. A relationship between scurvy and hemorrhagic pachymeningitis has been suspected as early as ten or more years ago, but it has not been possible to prove it. In this case, however, the X-ray findings (besides the rachitic changes) are so mild and indistinct as not to permit an exact diagnosis.

This case belongs in Group I of the types of pachymeningitis hemorrhagica in infancy, as described by Rosenberg (Berlin, 1913). This is the type with a slow onset, running a course like an internal hydrocephalus, with very few symptoms from the central nervous system. The second period of high fever in this case was a rather unusual feature.

The subdural punctures were continued at first to reduce the highly increased intracranial pressure, and later only small amounts were withdrawn for the purpose of controlling the changes in the subdural fluid. The anemia was treated with iron and one intraperitoneal blood transfusion. A diet high in vitamins was given. There was a definite improvement.

The prognosis in this case seems quite good. No recurrence of hemorrhages was observed; the intracranial pressure returned to normal and no abnormal increase in the size of the head was noticed for more than one month after the last subdural puncture. That the child was unable to hold up the head or sit up when over seven months old is due in part to the mild rachitis as well as to a peculiar debility which is very frequently found after a pachymeningitis. The prognosis as to the mentality has to be somewhat guarded because a certain percentage of such children who recover have been found to be mentally retarded when examined several years later.

## BILATERAL SPONTANEOUS PNEUMOTHORAX: REPORT OF A CASE*

HARRY G. WOOD, M.D.
*Rochester, Minnesota*

The exact percentage of cases of recurring attacks of spontaneous pneumothorax is difficult to determine accurately. In a series of seventy-one patients observed in The Mayo Clinic, 21 per cent gave a definite history of multiple attacks, and an additional 24 per cent gave an indeterminate history strongly suggestive of previous spontaneous pneumothorax. In 11 per cent of the series both a right-sided and a left-sided spontaneous pneumothorax had occurred at different periods, but in only three cases, approximately 4 per cent, had bilateral pneumothorax occurred simultaneously or with such a short interval that both sides showed partial collapse at the same time. The case reported here is illustrative.

A man, aged thirty years, who came to the clinic September 17, 1930, gave a history of having been apparently perfectly healthy until the age of fifteen years. Then he had an attack of sudden sharp cutting pain throughout the entire pulmonary area, most severe in the upper part of the thorax and shoulders. The pain came with inspiration; there was no pain while he was holding his breath. There was moderate cough and expectoration and some dyspnea. One treatment with a therapeutic lamp gave immediate and complete relief. The patient felt well and apparently remained in excellent health for ten years following this episode. The family history was negative for tuberculosis. The patient had been a heavy cigarette smoker and had had a chronic cough and expectoration for the last ten years. He remembered one attack of pain in the thorax about six years before admission similar to the one occurring at the age of fifteen years. This was relieved by strapping the thorax. Five years before admission, there was moderate hemoptysis on one occasion, but no history of bleeding otherwise. Further attacks of pain in the thorax had not occurred until two years previous to examination. Since then, at least five attacks have occurred, four of which were in the left side of the thorax; the other was in the right side. There were numerous other less severe attacks which may or may not have been associated with partial pneumothorax. Fever, sweating or effusion was not present. The outstanding symptoms with all attacks were pain and dyspnea with increased irritative cough and little

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Submitted for publication April 1, 1931.

expectoration. The pain generally began in the precordial area; became general throughout the thorax and radiated to the shoulder. It generally lasted two or three days; the dyspnea lasted from eight to ten days and there had been complete subjective relief in three to four weeks. Various diagnoses had been made, but only one roentgenogram of the thorax had been made, about ten months before admission. This showed some infiltration of both the right and left apex but no pneumothorax. The patient had been working hard and had lost weight. He stated that he tired easily. He had been made to rest more and had been placed on a supernourishing diet. In a period of three months he gained 25 pounds. Seven days before admission, without exertion, there was a sudden onset of the usual symptoms: pain, dyspnea, cough and some expectoration. He continued working part time and driving his car for six days.

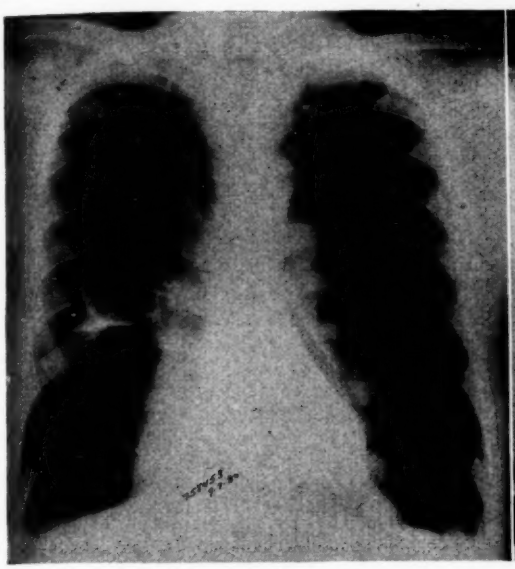


Fig. 1. Bilateral pneumothorax with multiple pleuritic adhesions on the right and definite circular line in the right lower part of the thorax, suggestive of a large emphysematous bleb replacing the right lower lobe.

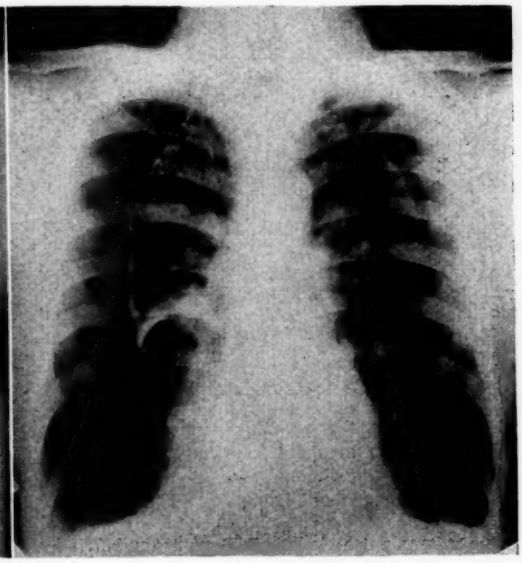


Fig. 2. Recurrent pneumothorax of the right side.

At examination in the clinic the patient looked sick; he had an anxious facial expression, he was definitely dyspneic and seemed to be in some pain. Both temperature and pulse were normal. The percussion note was hyperresonant throughout the entire pulmonary area, with marked suppression of the breath sounds, and vocal fremitus and vocal resonance were almost absent. There was no tinkle, no succussion and no coin sound. The roentgenogram of the thorax (Fig. 1) showed bilateral pneumothorax with multiple pleuritic adhesions on the right. The right lung was collapsed to approximately a fourth and the left to a half its normal volume. In this roentgenogram there was also a definite circular line showing in the right lower part of the thorax, suggestive of a large emphysematous bleb replacing the right lower lobe. Although a small amount of fluid was manifest at both costophrenic angles by roentgen-ray examination for a few days, it soon disappeared and the patient made fairly rapid subjective and objective improvement until September 27. At this time, he laughed heartily, a coughing spell followed and he became quite dyspneic, but had no pain. A roentgenogram of the thorax (Fig. 2) September 29 showed absence of the circular line in the right lower part of the thorax and increased collapse of the right lung. Apparently there had been a rupture of this cyst. The patient improved rapidly following this fresh pneumothorax, with rapid expansion of both lungs, but with recurrence of a large cyst of the right lower lobe (Fig. 3). October 18, a few minutes after slight exertion, there was sudden severe pain throughout the entire thorax and rapidly increasing dyspnea and cyanosis. The patient soon became comatose. He was placed in an oxygen chamber and both thoracic cavities were aspirated; 650 c.c. of air was removed from the left side of the thorax and 400 c.c. from the right. He immediately regained consciousness and there was gradual but continued objective and subjective improvement until he was well enough to go to Tucson for sanitarium treatment five weeks later. At this time, the right lung was completely reëxpanded with no evidence of cystic lower lobe. The left lung was almost completely expanded save for a small area of localized retraction at the apex, presumably due to adhesions.

During the period of three months that the patient remained under observation, there was no elevation of

temperature or pulse and numerous examinations of sputum failed to reveal the presence of the bacillus of tuberculosis. Coincident with the expansion of the lungs, definite infiltration of both upper lobes became manifest. During the last month of observation, there was a definite increase in the extent of infiltration in the right upper lobe, with development of cavitation. The Wassermann reaction of the blood was negative and the patient maintained a high normal blood count throughout. Granular casts were found on two occasions. Moderate chronic prostatitis was present. There was no evidence of renal tuberculosis.

The patient complained greatly of abdominal distention with indefinite pains and soreness, but roentgen-ray examination of the gastro-intestinal tract was negative; the symptoms were apparently reflex in origin.

During the last three months, this patient has had sanitarium care at Tucson and has improved steadily. There has been no recurrence of pneumothorax. Roentgenograms were made March 13 (Fig. 4) and are reproduced here by courtesy of his physician, Dr. Samuel H. Watson. They show complete expansion of both lungs with a definitely lessened amount of infiltration, showing apparent obliteration of the cavity.

There are many points in this case of unusual interest. The initial spontaneous pneumothorax occurred fifteen years ago. There has been an indeterminate number of attacks since. Both sides have been involved simultaneously on at least two different occasions. The last time, the collapse was so extreme as rapidly to cause unconsciousness and there is no question that death would have followed without immediate decompression.

Definite pulmonary tuberculosis is present, and tuberculosis must be accepted as an etiologic factor. Nevertheless, frequently recurring attacks of spontaneous pneumothorax over a period of years, without temperature or occurrence of definite effusion, is more characteristic of the so-called idiopathic nontuberculous type of disease. The cystic changes occurring in the right lower lobe with rupture and recurrence of cyst are hard to explain on the basis of pleural tuberculosis. The possibility that there is more than one etiologic factor must be considered. It is probable that this patient has congenital pleural imperfections and that this condition as well as pleural tuberculosis has been responsible for the frequently recurring spontaneous pneumothorax.

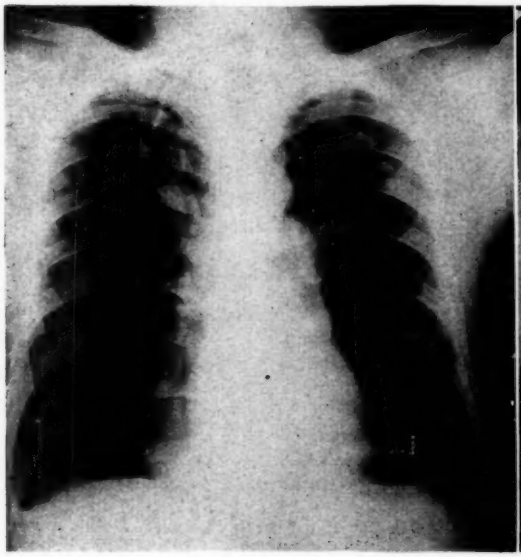


Fig. 3. Recurrence of emphysematous cyst of right lower lobe following recurrent pneumothorax.

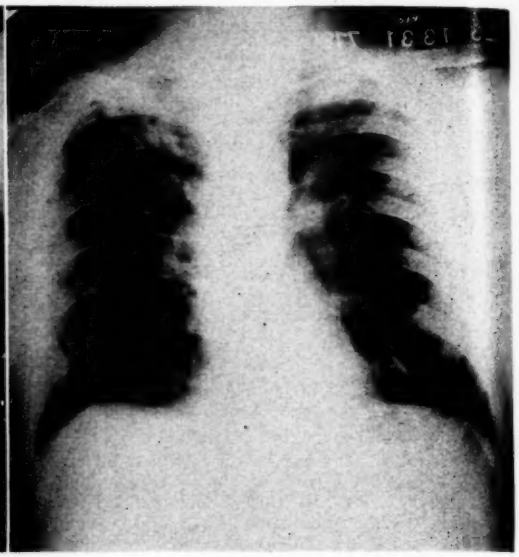


Fig. 4. Complete expansion of both lungs with improvement of the tuberculous process.

## SARCOMA OF THE THROAT*

### REPORT OF TWO CASES

J. A. WATSON, M.D.
*Minneapolis*

*Case 1.*—G. K., a male, aged 22, consulted me March 5, 1926. He first noticed in May of 1925 that his throat had commenced to hurt on swallowing. In June he had his tonsils removed, after which he kept coughing up masses of fleshy material. He had radium treatment at a certain clinic during that summer and lost about twenty pounds in weight through not being able

*Read before the Minnesota Academy of Ophthalmology and Otolaryngology, Minneapolis, January 9, 1931.

to swallow. The diagnosis at the clinic was cancer of the throat.

Previous to this illness he had never been sick, except for measles when he was twelve years old. He very seldom had colds or coughs, had always been strong and able to work hard on the farm. The family history was entirely negative. His mother had died at fifty-one of appendicitis, his father and four sisters were all living and all in good health. The examination of the throat revealed great numbers of masses of a polypoid appearance clustered around the upper and posterior rim of the larynx and greatly resembling nasal polypi. They covered entirely the arytenoid region, one or two of the masses hanging down into the cavity of the larynx, but not reaching to any depth there. The whole right pyriform fossa was filled with large masses of the growth, giving the impression that they originated in this region.

Two specimens were removed for microscopic examination, one from the region of the right pyriform fossa, the other from the neighborhood of the left arytenoid. Smears were also taken. There were found in the smears and sections large numbers of fungoid organisms which Dr. Henrici and Dr. C. J. Watson of the University identified as Citromyces. Dr. E. T. Bell's report was as follows: "I have examined several sections of the growth from the larynx of G. K. The specimens invariably show an abundant granulation tissue growth, but I have never seen any evidence of carcinoma. The fungi repeatedly found are in my opinion the cause of this unusual growth."

Dr. Leo G. Rigler reported on the X-ray examination as follows: "The patient is of the asthenic type. The bony thorax is normal. The diaphragm movements are free and equal. The trachea is in the midline. The cardiac shadow is normal in size, shape and position for this type of individual. The hilus shadows are considerably thickened. The linear markings are moderately increased, especially in the right lower lobe.

"There is evidence of interlobar pleurisy between the middle and upper lobes on the right side of very slight extent.

"Right Lung: The apex and upper lung field is clear. In the lower portion of the right lung there is a number of small nodular shadows about 2 mm. in diameter and one large nodular shadow which is anterior and out near the periphery about 0.5 cm. in diameter.

"The exact nature of these shadows is not entirely clear. They are rather dense and might correspond to a healed tuberculosis. They could, however, be associated with aspergillosis, although there is no evidence of cavitation such as usually occurs in this condition.

"Left Lung: The apex and outer lung fields are clear.

"Conclusion: Nodular lesion, right lower lobe. Etiology not clear."

On March 19 it was apparent that something must be done to save the patient from death by inanition, if not by asphyxia, as he was unable to swallow and there were times when there was a certain amount of dyspnea. Consequently, large amounts of the pathological tissue were removed, the work being done under indirect laryngoscopy. There was very little bleeding; most of the growth was bitten away by forceps. Within a week the growth was nearly as large as before and it was necessary to repeat the procedure many times in order to give the patient some relief. Radium and X-ray therapy were both used without result. Repeated microscopic examinations of the growth always brought a report to the same effect, namely, abundant granulation tissue, but without any evidence of malignancy. Numerous specimens, large and small, from all portions of the growth were submitted, and there was always an abundance of Citromyces. Because the patient was evidently doomed without some more radical procedure and because so far it had been impossible to find any tissue which gave microscopic evidence of malignancy, access was finally gained to the throat by means of a pharyngotomy. After tracheotomy and the insertion of a tube, the hyoid bone was divided in the center by a vertical incision, from the upper end of which a horizontal incision was made reaching to the anterior border of the sterno-hyoid muscle. By careful dissection through the depths of the neck and retraction of the triangular flap, it was possible to gain good access to the throat. All of the growth apparently was removed by means of the diathermy knife. In the depths of the pyriform fossa, however, one was so close to the carotid vessels—the pulsation of which could be felt under the finger with apparently almost no intervening tissue—that there was from the beginning doubt as to complete eradication in that direction. The rest of the growth was followed and as was hoped, destroyed everywhere. The tracheotomy wound was kept open for many weeks. The patient recovered satisfactorily and for a long time the outlook seemed hopeful. In about two and one-half months recurrence was evident in the depths of the right pyriform fossa, and it was not long until the same tedious and disagreeable process of removing masses piecemeal in order to prolong the patient's life was, perforce, resorted to.

In January of 1927 the patient returned to the clinic, where he had been first treated, for inspection, and I received a letter from them stating that they had again examined the tissue which I had sent with the patient and that the diagnosis was carcinoma, grade four, the same as at the time of the original examination. The conflicting reports were most puzzling, especially in view of the history and clinical course of the disease. The man's age, twenty-two, was certainly against the growth being carcinomatous. The fact that even after the last year and a half of observation, nearly a year of it by myself and my partners, there was at no time any evidence of involvement of the cervical glands, was still more strongly against the probability of the condition being carcinomatous. Specimens were again sent to Dr. Bell, who now reported that the growth was certainly not carcinoma, but that there were evidences in the later specimens of commencing sarcomatous degeneration. The issue being joined, a quantity of specimens was sent to Dr. James Ewing at the department of Pathology, Cornell University Medical College. Some of these were specimens taken early in

the history of the case, others those taken later. Dr. Ewing's report follows: "In the case of G. K. sections of tumor of the larynx which you send me show a very cellular myxosarcoma. In the sections taken a year ago, I find nothing but granulation tissue, or chronic inflammation of the submucosa. In all the other sections and especially in the last one, number five, there is a very cellular and large oval cell tumor which surrounds blood vessels and shows the typical structure of nasopharyngeal myxosarcoma.

"In my experience this is a very malignant tumor and very few cases are cured. Burnham and Kelly's Institute seems to have cured one case by keeping up small external applications of radium for a year or more. This case is reported in the "Archives of Surgery," 1923, 6:429. We have lost several cases at the Memorial Hospital by attempting to destroy the tumor by surgery or caustic radium. We now have some cases under treatment by repeated moderate doses of external radiation. If you attempt to remove or cauterize these cases, they eventually become infected and die from sepsis or hemorrhage, whereas slower restraint to growth can somtimes be obtained by the less violent radiation methods."

In this case, however, hemorrhage was not the cause of the eventual death, and, while sepsis played some part in the production of the exitus, the patient died mainly as a result of inanition, as for some weeks before the end it was almost impossible to administer nourishment or even water. The growth extended downwards into the esophagus and even involved the tracheotomy wound, though it was possible to keep the tracheotomy tube clear until the last.

*Case 2.*—Mrs. E. I first saw this patient on July 23, 1928. Nine or ten months previously she first experienced a feeling of not being able to breathe or swallow on lying down. She had since been under treatment with radium and local applications, but no exact diagnosis had been made. A laboratory examination by Dr. Bell of the University had shown granulomatous tissue only. A growth had been discerned by her family physician on the right side of the throat. The Wassermann and all other tests were negative. My partner, Dr. W. E. Patterson, had seen the patient in consultation during my absence from the city; he believed it to be malignant and I agreed with him on my first examination.

Examination disclosed a large mass protruding from the right side of the hypo-pharynx in the upper part of the pyriform fossa. The tissue appeared to be of firmer consistency than in the former case. There was considerable infiltration of the pharyngeal wall around the protruding portion of the growth, which was large enough to produce some pressure against the larynx and epiglottis. There was very little appearance of redness or congestion of the mucous membrane. The growth was sessile and larger than one-half the size of a walnut; there was no involvement of the cervical glands.

The patient's general health was good. Physical examination disclosed nothing of importance. She had been having some pain in the right side of her throat and in the right ear, and the act of swallowing produced considerable discomfort.

At my suggestion she was referred to a prominent Chicago laryngologist for consultation. He believed the tissue to be granulomatous and non-malignant and proceded to remove it by electro-coagulation. He submitted the tissue to microscopic examination and was confirmed in his opinion of non-malignancy, writing us a letter to that effect. An examination, however, of later sections caused his pathologist to change his mind and a second letter reported that the former opinion had been revised, the growth now proving to be fibrosarcoma.

In March of 1929 the patient came to my office. There was a large scar at the site of the growth and I feared that there were signs of recurrence. When she next returned, in about six weeks or two months, there was a very considerable mass with odor and discharge. I advised her to return to Chicago. Since that time several operations have been done by means of electrocoagulation, the growth always showing an invincible tendency to recur.

Sarcoma of the throat is certainly rare as compared with carcinoma. It occurs much earlier in life as a rule than the latter disease, which is a diagnostic point that should be taken into consideration. In sarcoma the cervical glands are rarely involved, or, if at all, not until late. In the history of intrinsic carcinoma of the larynx, they are almost always involved before the disease has run any very lengthened course. This observation as to glandular involvement is, of course, equally true of the two diseases in other parts of the body.

There are certain lessons to be drawn from these two cases. Even though the microscope shows no malignancy, all so called granulomatous tissue in the throat should be looked upon with extreme suspicion. Negative microscopic evidence should certainly never be taken as conclusive in the face of any persistent mass, in this situation at least. I think that the very term granulation tissue should make a more exact diagnosis imperative. Granulation tissue has an underlying cause and it is early in the history of such masses that the cause must be found. If they do not yield very readily to mild local applications, if there is no reason to suspect any local inflammatory condition, no increased leukocyte count, no elevated temperature, no benign cyst formation, no positive Wassermann, no evidence of tuberculosis, and in short no apparent reason for it, the mass should be considered malignant, in spite of a microscopic diagnosis of "granuloma" or "granulation tissue growth."

Such a diagnosis of malignancy, even though it be more tentative than positive, having been made, the question of treatment arises. I believe that sarcomatous growths in the throat are almost hopeless, yet it has always seemed to me that in the first of these two cases, even though the very radical procedure of pharyngotomy and the diathermy knife was undertaken at a late stage in the history of the disease, it came within a measurable distance of a cure. Furthermore, I believe that he might even have been cured had it

not been for a very close proximity of the growth to the great vessels of the neck. Possibly the vessels should have been ligated, but at the time of operation he was in no condition for it, and there was ground for hoping that the eradication was complete.

It is true that the primary site of the growth in this particular case may have been very close to the great vessels and that even if that very radical procedure had been undertaken a year or more before it was, it could not then have been eradicated. Nevertheless, I feel that valuable time was lost by temporizing with the condition. In the second case, profiting from my experience in the first, and in view of the fact that radium had already been repeatedly tried, I advised the friends to choose between one of two courses: first, to leave the growth entirely alone with the possible continuation of radium treatment or, second, to resort to the radical procedure of pharyngotomy. I believe that my advice was justified by the outcome, as the condition has become manifestly hopeless. The disease has invaded the bodies of the fourth and fifth cervical vertebræ. The patient is breathing through a tracheotomy tube and is being fed through an artificial opening into the stomach.

## DOUBLE BRANCHIAL CYSTS COMPLICATED BY CARCINOMA OF THE LARYNX*

ARTHUR L. HERMAN, M.D.
*Minneapolis*

The following case has two independent features, each of which is important for different reasons. The first is the branchiogenic nature of a carcinoma of the larynx, to which a review of the literature shows no parallel. The second is the existence of two branchial cysts on the same side of the neck, the possibility of occurrence of which has been denied according to certain theories regarding the origin of branchial cysts and fistulæ.

The patient, a male, fifty-one years of age, was first seen March 21, 1927, some two months after the onset of symptoms. These consisted of a hoarseness and tenderness in the left side of the neck and followed an acute coryza.

Twenty years previously the patient had been confined to a tuberculosis sanatorium for several months but had no symptoms of activity since. He had had a gastro-enterostomy performed one year previously for a duodenal ulcer. At that time no masses were noted in the neck. His wife had died of a luetic aortitis.

Upon examination the tonsils and pillars were found to be injected. The deep cervical glands on the left were very hard and fixed. Two certainly, and possibly three, were noted. From the character of the glands malignancy was suggested.

The left vocal cord was found to be immobile. There was a smooth, elevated, reddened mass in the left recessus piriformis over which the mucous membrane was intact. X-ray of the chest was normal in appearance and the Wassermann was negative.

On the basis of these preliminary findings, the most likely diagnosis seemed to be carcinoma of the pyriform sinus, with metastases to the deep cervical glands.

Supporting this diagnosis were the age of the patient, the nature of the onset of the disease and the character of the masses palpated on the side of the neck.

Because of his confinement in a tuberculosis sanatorium, tuberculosis was considered, although there were no chest findings either on physical or X-ray examination.

Lues was also considered because of the fact that his wife had been infected. However, the Wassermann was negative and there were no other clinical signs suggesting lues.

These were the only possibilities considered at this time.

The possibility of branchial cysts was not even considered, for a branchial cyst has been always described as a single, solitary mass and in this case there were multiple masses. Hamilton Bailey reported a case of branchial cysts which upon section showed numerous tubercle bacilli. Some such bizarre combination perhaps should also have been kept in mind.

On March 25, a biopsy was performed. Upon excising part of the wall of one of the masses, a white, cheesy material escaped under considerable pressure. We fell into the common mistake of thinking we were dealing with a tuberculous lesion. Microscopic section, however, showed a cyst wall and a diagnosis of branchial cyst was made.

It was interesting to note that on the following day the patient's voice was strikingly improved. We explained this by the relief of pressure on the vagus or recurrent laryngeal nerve.

Aphonia due to pressure by branchial cysts have been reported by Carp and Thompson. Carp thought that the aphonia was due to pressure on the vagus. Thompson has reported a case with dysphagia, pain and aphonia, with fixation of the left vocal cord. At operation the cyst was found to be attached to the left lamella of the larynx and the greater cornu of the hyoid. Following the operation there was complete restoration of the voice.

In our case, following this temporary improvement after the biopsy, the voice became gradually worse. By this time we felt that we were dealing with a branchial cyst of the larynx and a separate branchial cyst of the neck.

The question of the proper procedure arose, *i.e.*, whether it would be better after a preliminary tracheotomy to do a section of the larynx and excise the cyst; or to excise the branchial cyst in the neck first and remove the cyst in the larynx at a second operation; or third, to do a tracheotomy and then later to remove both the cysts at one operation.

In deciding upon the procedure to follow, we perhaps allowed ourselves to be unduly influenced by the remarkable relief secured by lessening the pressure in

*Thesis presented before the Minneapolis Surgical Society at the meeting of January 6, 1931.

the cyst as a result of the biopsy. It was felt that considerable relief could be obtained by removing the branchial cyst in the neck first and then the cyst in the larynx could be attacked later if the patient was not sufficiently relieved of his symptoms.

Accordingly, on June 3, 1927, an incision was made along the anterior border of the sternomastoid. A cyst was found fairly superficially. It was dissected out according to the method described by Hamilton Bailey, *i.e.*, about half the contents were drained off and then the cyst was grasped with a sponge-holder and two small squares of gauze. On making traction, a piriform projection of the cyst was found to run upward. By bluntly dissecting this it was found to run upward between the internal and external carotid arteries and became frayed out just before it reached the region of the tonsil. Further exploration of the neck revealed a second cyst. This cyst had a similar projection which extended horizontally between the jugular vein and the common carotid artery, and seemed to pierce the wall of the larynx. As much as possible of this projection was removed with the cyst. These two cysts were each about two centimeters in diameter. They were entirely separate from one another, one evidently corresponding to a second, and the other to a third branchial cleft derivation. The piriform projection of the upper cyst had the classical relation to the carotid arteries, passing between the internal and external carotids. The tract of the lower, however, passed in front of the carotid instead of behind it as usually described.

When this patient was discharged from the hospital it was noted that his voice had again greatly improved.

A new symptom, pain upon swallowing, appeared during the month following the operation. This pain seemed to be localized in the region of the left tonsil. The left tonsil was seen to gradually enlarge and to project more and more into the pharynx. This pain could be entirely relieved by anesthetizing the left tonsil and its pillars.

Since it was felt that this condition was probably due to the fact that some of the tract had been left behind, tonsillectomy was performed with subsequent alleviation of the pain.

On August 12, about two months after the removal of the cysts, two distinct, very hard masses were palpated behind the sternomastoid muscle.

A week later there was a sudden reappearance of the pain upon swallowing. This pain was much more severe than it had been previously. The swelling in the left piriform fossa seemed to be larger and redder and the mass in the left posterior triangle of the neck was definitely larger.

A few days later, on August 27, he coughed up a considerable quantity of blood and pus, following which the pain was considerably relieved.

Laryngoscopic examination showed the mass in the left piriform fossa to be smaller, paler, and apparently shriveled.

By October 21, there was evidence of laryngeal obstruction. The patient was referred to Dr. Lerche for tracheotomy. Prior to the tracheotomy, one of the glands was removed from the neck. Microscopic examination showed squamous cell carcinoma.

Laryngoscopic examination on January 20, 1928, showed increase in the size of the mass in the larynx. There were many more glands externally.

The patient died April 21, 1928, fifteen months after the onset of symptoms. No autopsy was obtained.

Examination of the first biopsy and of the two branchial cysts was made by Dr. W. A. O'Brien. He found no evidence of malignancy in either of these specimens.

In spite of the impossibility of autopsy confirmation, it seems reasonably certain that this condition was one of branchiogenic carcinoma on the basis of a branchial cyst of the larynx with metastases to the glands of the neck. This picture was further complicated by the presence of two benign branchial cysts of the neck.

Just when the metastasis to the glands of the neck took place cannot be accurately determined, although it is my belief that it had already taken place when the patient first consulted me and that the second implanatations were too small to be seen or were not in the operative field at the time the branchial cysts were removed.

Subsequent to removal of the two branchial cysts, gradually enlarging masses appeared posteriorly to the incision. On account of their location and because of the fact that the branchial cysts showed evidence of marked chronic inflammation with considerable thickening of their walls this enlargement was at first looked upon as inflammatory and its true character overlooked. That these metastases were secondary to the growth in the larynx seems indisputable since there was no other primary focus demonstrable. That the growth in the larynx was branchio-genic in origin seems to be established by the fact that there were other branchiogenic rests present. That it was cystic is proved by its appearance and its subsequent rupture and drainage of cyst contents, and that it was malignant, by its continued growth even after spontaneous drainage of its contents.

## DISCUSSION

To show clearly the embryologic significance of the occurrence of two distinct branchial cysts, each of which has a separate tract, one pointing toward the pharynx and the other toward the larynx, is not permitted by the limited time at my disposal, so I shall omit all discussion of this interesting feature and discuss briefly branchiogenic carcinoma of the larynx.

Malignant degeneration of a branchial cyst was first reported by Von Volkman in 1882. McFarland's report in 1926 brought the number of cases to 359. Belk in 1927 reported ten cases. Most figures regarding the number of these cases are undoubtedly too high because of the fact that different authors employ varying criteria in establishing a diagnosis. For instance, by many, mixed tumors of the parotid are included under the head of branchiogenic tumors. Furthermore, many call all malignant tumors of the neck, which have no demonstrable primary focus, branchiogenic tumors.

When we bear in mind that many cases have been called branchiogenic tumors even without postmortem

examination to rule out a primary focus, it is apparent that many cases so reported are not branchiogenic carcinoma at all but are secondary to undemonstrated minute primary foci in the nasal sinuses or the larynx. The only lesions whose branchiogenic origin can be established beyond doubt are those which have a cystic structure so that it can be reasonably assumed that the carcinoma began on the basis of a branchial cyst. In solid tumors suspicion always remains that they are secondary and the primary lesion has been overlooked. This fact has been previously stressed by Carp and Stout, by McKenty, Richardson, Brandt and Hudson.

If we include only cases which are undoubtedly malignant degeneration of pre-existing cysts, this condition becomes much rarer than the literature suggests.

One such case has been reported by McKenty. Roeder has reported a case which was operated upon by removal of all the structures from the right side of the neck. This patient was well four and one-half years after the operation.

Schriener reports 16 cases out of 7,376 records since 1914, although whether these are all strictly branchiogenic carcinomata might be reasonably doubted for the reasons stated above.

Carp and Stout, out of 3,961 neoplasms observed at the Presbyterian Hospital and of which 1,538 were cancers, found only four of branchial origin.

According to Ewing, these tumors are of two types —solid and cystic; the usual form being cystic. Ewing further states that definite information in this field is lacking.

The treatment of this type of tumor is most discouraging. Except for Roeder's patient who was apparently well four and one-half years after a very radical operation, all of the cases ended fatally, a few months after recognition. X-ray and radium therapy seem to be of little if any avail.

In the literature, I have not come across a case of branchiogenic carcinoma of the larynx. Even benign branchial cysts of the larynx are extremely rare.

In 1929 Imperatori operated on a branchiogenic cyst of the larynx by thyrotomy, with complete recovery.

In 1928 Watson reported a case in which the cyst encroached upon the glottis and caused sudden suffocation and death. It is of interest to note that in this case the voice, prior to the fatal attack, had never been affected.

Rosenberger reported a cyst in a new-born, causing increasing dyspnea with death from suffocation, after four weeks.

## CONCLUSIONS

Early diagnosis of malignancy seems very difficult. Treatment after the malignant stage has been reached seems very ineffective, although the very radical method suggested by Roeder offers some promise. Because of the relative frequency of malignant degeneration it seems justifiable for this reason alone to remove all branchial remnants as soon as they are recognized.

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# PRESIDENT'S LETTER

THE Seventy-Eighth Annual Meeting of the Minnesota State Medical Association is now history, and, therefore, thanks, appreciations and certain retrospective reflections are in order.

Perhaps the most conspicuous thing revealed by each of these great state gatherings of medical men is the large number of busy, important men who are taking an active part in the routine detail of the affairs of organized medicine in Minnesota.

More than twenty committee reports were received and acted upon in two brief House of Delegates sessions, representing the year-long, hard work of an infinitely greater number of men. I am disposed to challenge any other organization, of whatever kind, in Minnesota to exhibit a comparable interest and willingness to work on the part of its members.

It is worthy of note that the House of Delegates worked efficiently and well, and with extraordinary harmony. These two sessions, with the council meetings that preceded and followed them, constitute an outstanding example of what great bodies of men may accomplish, given willingness to work and the sense and intelligence necessary to participate in the give and take of discussion without acrimonious feeling.

Expressions heard from the floor of the house were unanimous in their appreciation of the year's work of the committees, particularly of the great major committees, the Public Health Education, and that on Public Policy and Legislation. These committees are all engaged in the business of transforming the profession of medicine in Minnesota from a collection of unrelated units to a powerful, responsive and responsible instrument, competent both to assume proper leadership in a public-health-minded world and to protect both itself and the public against irresponsible, socialistic experiments.

The special committee appointed last year to study the policies of the organization made its first report at this meeting. This committee was composed of five busy practitioners, and the report they prepared, which obviously required a great deal of time and careful study in its compilation, was a conscientious, sane, unbiased appraisal of the worth of our activities, with equally sane and well considered recommendations for the future. The report was thoughtfully considered, both by the Council and the House of Delegates, and the discussion which it prompted in both bodies will remain one of the high points of the 1931 meeting. It is by such unprejudiced, impersonal self-estimations that great organizations, as well as individuals, keep their perspective and continue to direct their energies toward wise and essential ends.

A new committee was formed at this meeting, likewise, which is directed at the most vital present problem of medicine. This is the Committee for the Study of the Problem of Medical Economics. No one who attended this meeting, or who picks up any of the better class lay magazines on the news stands can fail to be impressed with the great need for such studies among practical, practising medical men. Curiously enough, it is the sociologist, the social worker, the school man, the public health worker, the employee of the scientific foundation, who has offered most of the testimony hitherto and dug up most of the accepted facts. It is none too soon for the practising physician to make his contribution. Such a study as this committee contemplates is no vague research thrusting at shadowy adversaries. It must be a practical fact-gathering body looking to some immediate practical program for the adjustment of our own economic problems. It deserves the best brains and efforts which our association can muster. It will have a high function to perform in the medical rearrangements of the future, a heavy burden of responsibility for the proper steering of our course out of present economic entanglements. Of that we should all be well aware.

I wish to recall the graceful tribute, with its accompaniment of a gift, which was bestowed upon Dr. Workman, at this meeting, for his years of loyal service and hard work for the association. It was a pleasant incident of the banquet and of the meeting. Dr. Workman has deserved well of our association. He has worked without the slightest thought of a reward and sometimes, no doubt, it has seemed a *thankless* task. He now knows that he always has had the respect, gratitude, and loyalty of his associates.

In closing may I add this bit from Lowell Hoyt? It seems to me a very pertinent quotation.

> "It is spring. Things are looking better. Folks feel better, but a lot of encouragement is needed. Everybody should be a disciple of optimism. Talk it. Act it. It is contagious, makes people forget past failures and the faults of others, and it will inspire them with finer courage, greater enthusiasm and a new hope and new spirit of accomplishment."

L. Logge

President
Minnesota State Medical Association.

# EDITORIAL

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J. R. BRUCE, Business Manager
2642 University Avenue, Saint Paul, Minnesota
*Telephone: Nestor 1381*

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## STREPTOCOCCUS VACCINATION IN CHRONIC ARTHRITIS

The classification of arthritis is at present unsatisfactory. While the etiology of certain forms of arthritis is known, there is no agreement as to the cause of acute rheumatic arthritis and chronic arthritis—hypertrophic, atrophic, rheumatoid —call it what you will.

Clinically acute rheumatic arthritis, subacute bacterial endocarditis, and infectious arthritis have been considered separate entities, although confusion in diagnosis occasionally may occur. Pathologically the endocardial lesions in the first two diseases mentioned, while usually easily differentiated, are certainly at times similar and may occur simultaneously. The Streptococcus viridans has been established as the cause of subacute bacterial endocarditis. Clawson's finding of a green-producing streptococcus in an appreciable percentage of cases of acute rheumatic fever has convinced him of the identity of the two diseases. It is rather startling to have him announce that he has identified the same organism from the blood in fifty per cent of chronic arthritis cases, indicating the common etiological factor in the three diseases.

Immunological studies of the blood in acute rheumatic arthritis cases by Birkhaug and Swift, Clawson, and others have shown these patients to be hypersensitive to streptococci. Clawson has shown by experiments on animals that hypersensitiveness to streptococci can be produced by subcutaneous inoculation of streptococci and agar, with the production of an abscess, and further that these animals can be desensitized by intravenous (not subcutaneous) injection of streptococcic vaccine. Extending these observations to clinical application, patients with not only acute rheumatic fever but with chronic arthritis have been and are being treated by intravenous vaccination with a streptococcic vaccine. This is not the first time that vaccine or even streptococcic vaccine has been recommended for chronic arthritis. Typhoid vaccine intravenously in these cases has been tried extensively with but only a modicum of success. Coley's fluid has had some vogue. Clawson's experiments seem to indicate that the desensitizing effect is not due to a foreign protein but can be obtained by various members of the streptococcus family. He is using in his clinical experiments a stock culture of a Streptococcus viridans derived some eight years ago from the blood of a patient suffering from acute rheumatic arthritis.

As a result of the untimely lay publicity regarding the clinical trial of this vaccine in chronic arthritis patients, Dr. Clawson has been swamped with letters from sufferers in every state in the union and physicians have been importuned to get by hook or by crook some of the new vaccine. It is unfortunate. Dr. Clawson him-

self admits the work is in an experimental stage and has wisely refused to distribute the vaccine widely. Those who heard him speak at the state medical meeting and who heard Dr. Wetherby describe the clinical phase of the work being done, know that conclusions as to the ultimate value of the administration of streptococcic vaccine intravenously in chronic arthritis cannot be drawn. Dr. Clawson is a careful observer and it is certainly to be hoped that his studies will add to our woefully limited means of treatment of this disease.

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## THE STRANGE CASE OF DIABETES

It is startling to learn that the mortality from diabetes in this country has shown a decided increase in spite of the discovery of insulin. It seems impossible. The discovery of insulin has been rightly hailed as one of the outstanding triumphs of medical science during the past decade, and its use in diabetes has proven invaluable in the prevention of death from coma and in obviating the necessity of markedly restricted diabetic diet. So striking has been its effect that the impression has been given by no less authority than Dr. Joslin that there is no excuse for a diabetic dying from his diabetes. This is doubtless an overstatement of the case. On the other hand, the prevention of many deaths from coma and the prolongation of life in youthful diabetics would naturally increase the percentage of diabetic deaths due to concomitant arterial diseases.

The February 5 number of the *Spectator* contains an article by no less an authority than Frederick L. Hoffman, Consulting Statistician of the Prudential Insurance Company, entitled "The Diabetes Record of 1929," which compares the mortality from diabetes in pre-insulin and post-insulin years. For fifty American cities, the death rate has mounted from 15.9 per 100,000 in 1912 to 23.3 in 1928, declining in 1929 to 22.9. Comparing the mortality rates for the years 1920 and 1927 in the registration area of this country, the reduction in both sexes during the youthful decades has been marked, while in the later decades the increase is startling. It is interesting to note that, while the mortality is slightly greater for the female sex in the first two decades of life, this predominance in the female sex is markedly in excess in the later decades. Comparing the figures for 1920 with those of 1927, this increase in mortality begins to make itself apparent after the age of fifty in males, whereas in females it becomes more apparent at the age of thirty-five. Another striking feature brought out is the marked variation between the mortality from diabetes in different cities, and from year to year in the same city.

What explanation can be given for this disappointing result?

In the first place diabetes is unquestionably more frequently diagnosed than formerly. The much more frequent life insurance and periodic health examinations of recent years have resulted in the detection of many unrecognized cases of diabetes. In former years, the associated existence of diabetes was doubtless often overlooked in patients dying of stroke, heart disease and gangrene.

This, however, does not explain the total increase in diabetic mortality. Certain other facts play a part. In the first place, diabetics are notoriously lax in their adherence to a restricted diet. The expense of daily insulin administration frequently results in its discontinuance. Then again insulin has little effect in the presence of acute infections and the diabetic has a poor resistance to various infections.

In view of the known facts, it seems highly probable that the incidence of diabetes in this country has greatly increased. This view is supported by a comparison of mortality records in this country with those of foreign countries. Compare the figure of 18 per 100,000 in our country at large with that of 11.4 in England and Wales and 6.3 in Italy for the year 1926.

It is not unreasonable to look for some fundamental error in our national diet to account for the picture. The increase in the per capita consumption of sugar in this country from 79 pounds in 1915 to 110 pounds in 1927 is suggestive if our ideas of obesity and overconsumption of carbohydrate as etiological factors in diabetes are correct. Here is a definite opportunity for the medical profession to advise the public of the probable danger that exists in the present day overindulgence in candy and sweets.

## UNVERSITY HOSPITAL STAFF REPORTS

The writer has recently had the loan of an unusual document developed intramurally by the University of Minnesota Hospital staff. In addition to a report of the clinico-pathological weekly conference and some snappy news items, the necropsy reports are interspersed with timely comments and deductions. But the most striking feature consists of the unusual abstracts from the literature, usually inspired by the cases under discussion and study.

Students and practitioners have long wanted some reliable, authoritative, easily available statement of current opinion or expression on outspoken clinical entities or syndromes. Text books rarely meet the need because so all-inclusive; much specific information is widely dispersed. A good text is scarcely written before it is incomplete. Then not all doctors have easily available the library and journal facilities found at our universities.

Therefore a set-up of "abstracts" dealing with a subject like "Jaundice" or "Lung Malignancy" has a mine of fresh, vivid and useful information, quickly orienting the reader to permit him to meet patients who have such disorders with greater decision and accuracy. It is to be hoped that in time these reports will expand into a publication for general use and distribution.

E. L. T.

# OBITUARY

### Dr. O. S. Neseth

1886-1931

Dr. O. S. Neseth of Kenyon died April 23, 1931, following an attack of influenza and pneumonia.

Dr. Neseth was born in Kenyon Township on December 25, 1886. He attended the Red Wing Seminary and obtained his medical degree at Northwestern University.

During the World War Dr. Neseth served as First Lieutenant in the Medical Corps. After practicing a few years in Decatur, Illinois, he moved to Kenyon shortly after the death of Dr. J. A. Gates in the summer of 1923.

Dr. Neseth was Master of the Masonic Lodge at Kenyon at the time of his death and a member of the Odd Fellows Lodge. He was also a member of the Rice County Medical Society, the Minnesota State Medical Association, and the American Medical Association. He was an ardent fisherman and a great devotee of the game of golf.

Dr. Neseth is survived by his wife, Julia; a niece, Mamie Keller; his father and mother, Mr. and Mrs. Sever Neseth; three brothers, Nels, Fred and Carl; and two sisters, Christine and Clara.

### Charles Sumner Bigelow

1845-1931

Dr. Charles Sumner Bigelow was born at Middlebury, East Akron, Ohio, December 15, 1845, and died suddenly at his home in Lynwood, California, April 13, 1931, at the age of eighty-five years. He was buried in Roosevelt Cemetery there, April 15.

Dr. Bigelow served in the Civil War in Co. F., 3rd Regiment, Wisconsin Volunteer Infantry. He graduated in Medicine and Surgery at the University of Michigan in 1873. That fall he was married to Miss Abigail Alma Pierce, from which union five children were born. He came to Claremont, Dodge County, Minnesota, in 1881, where he remained for three years. He went to Kansas for the next six years and returned to Dodge County in 1890. He located at Dodge Center, where he practiced until he retired in 1912.

Mrs. Bigelow died in 1910 and Dr. Bigelow was remarried to Miss Neva Bromley of Dodge Center, in 1916. They made their home at Two Harbors, Minnesota, until 1925, when they moved to California.

Dr. Bigelow served the people of Dodge Center for twenty-two years and was well known throughout the country. He was a member of the Masonic Lodge, the Knights of Pythias, Congregational Church and many other local organizations for many years.

Dr. Bigelow was a member of the State Medical Association for many years and was instrumental in organizing the Dodge County Medical Society in 1905.

Besides his many friends, Dr. Bigelow leaves to mourn his passing, his wife, Mrs. Neva Bigelow, two daughters, Mrs. Delia Pierce and Mrs. Chris Darsnek, two sons, Dr. Charles Bigelow and Major Albert S. Bigelow.

## PERTUSSIS VACCINES OMITTED FROM N.N.R.

The Council on Pharmacy and Chemistry reports that pertussis bacillus vaccine was admitted to New and Non-official Remedies in 1914 on the basis of what appeared to be acceptable clinical evidence. In subsequent years, when vaccine therapy was at its height, pertussis bacillus vaccine was used extensively and yet critically controlled reports did not become available. In 1928 the Council voted to omit pertussis vaccines with the close of the longest period for which any one was accepted, unless in the meantime acceptable evidence for its usefulness in the prevention or treatment of whooping cough became available. No acceptable confirmatory evidence having become available, the Council voted to confirm its decision to omit from New and Non-official Remedies all pertussis vaccines. (Jour. A. M. A., February 21, 1931, p. 613.)

# « A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION »

That the doctor has made great strides ahead in the conception of his duties to the public was demonstrated conspicuously in an obscure breakfast meeting between representatives of the State Medical Association and the Minnesota Editorial Association on Tuesday, May 5. Steadily the obstacles in the minds and traditions of the profession are being removed so that the doctor, and not the free lecturer with an almanac to sell, may be the real teacher of public health and public welfare.

In witness of the new trend, five Minnesota physicians—representatives of the association—and five representatives of the Minnesota Editorial Association inaugurated what is likely to be a new era in Minnesota in the relations between these two groups.

Technically this meeting was designed merely to pave the way for the appointment by both associations of a standing advisory board to be composed of five editors and five physicians with the widest possible representation in the state, whose duty it will be to meet regularly and iron out the little differences and misunderstandings and misconceptions that have kept the two looking at each other suspiciously at arm's length everywhere, and to bring about coöperation to effect acceptable methods of legitimate public health education.

This breakfast episode, almost buried in the avalanche of committee meetings and the scientific program of the May meeting, is likely to have a far reaching effect in Minnesota.

It is one of the proud distinctions of organized medicine in Minnesota that it has made unprecedented advances in the coöperation with and direction of public health agencies in the state.

This meeting has laid the foundation for an equally brilliant, sound, and effective coöperation in another direction. Lack of intelligent understanding of each other's problems has been the cause of bitterness and distrust between both professions immemorially. While such a state of things might, and generally did, formerly exist without seriously interfering with the doctor's or editor's function, it is now a thing of the past.

The business of bringing into being everywhere in the big cities and the small towns a happy relationship between editor and doctor is no stupendous task if the friendliness and moderation and understanding displayed at the preliminary meeting is a reliable sign.

Mr. Lou Benshoof of Detroit Lakes Tribune, Jefferson Jones of the Minneapolis Journal, Mr. Roy Dunlap of the St. Paul Pioneer Press and Dispatch, Mr. A. E. McGowan, executive secretary of the association, were among the representatives of the Minnesota Editorial Association present at the meeting.

The resolution passed at this conference follows:

"Be it resolved that this conference favors the forming of an advisory board of public relations between the Minnesota State Medical Association and the Minnesota Editorial Association of five representatives from each association. It is the sense of this conference that the representatives of the two associations be selected so as to have representation of the state at large."

This resolution was read and passed at the House of Delegates meeting later in the day and was similarly approved by the Editorial Association in session later in the same week.

A meeting late in the summer of the two committees is contemplated though their personnel is not yet complete.

# OF GENERAL INTEREST

Dr. M. H. Whalen is practicing in Duluth, with offices at 4701 E. Superior Street.

Dr. C. M. Rudie has moved from Mazeppa to Kenyon, Minnesota.

Dr. W. A. Gleason, who completed his interneship at St. Luke's Hospital in Duluth a year ago, is practicing at Osceola, Wisconsin.

Dr. H. F. Bayard, formerly of the Mayo Clinic, Rochester, Minnesota, has opened offices at 420 Medical Arts Building, Minneapolis, and is specializing in proctology.

Dr. J. V. Carlson, following the completion of his interneship at St. Luke's Hospital, Duluth, a year ago, may be addressed at 2 North Garfield Street, Alhambra, California.

Dr. Oliver Heimdal recently completed his surgical fellowship at the Mayo Clinic, Rochester, and has opened an office at 402 Graham Building, Aurora, Illinois.

Dr. H. Longstreet Taylor, St. Paul, was elected to the Executive Committee of the National Tuberculosis Association at its annual convention held in Syracuse in May.

Physicians are reminded of the necessity of filling out a transfer form with the Collector of Internal Revenue when changing their location in order to maintain their registration under the Harrison Narcotic law.

Dr. W. B. Rydell, after serving his interneship at St. Luke's Hospital in Duluth, has entered practice at Buffalo, Minnesota. Dr. R. A. Trombley is now located at Emmons, Minnesota; Dr. H. H. Green at Austin, and Dr. Karl Emanuel at Iron Mountain, Michigan.

Members of the Women's Auxiliary who are planning to attend the National Auxiliary meeting at Philadelphia may obtain hotel accommodations through Mrs. Frederick S. Baldi, Room 304, Chamber of Commerce Building, 1129 Walnut Street, Philadelphia.

Dr. Franklin R. Wright appeared before the Camp Release District Society in Olivia on April 27. Instead of reading a paper he answered questions for three hours on Venereal and Genito-urinary Diseases. Questions were furnished by members of the Society.

Dr. Harry A. Daniels has recently completed a Fellowship in Internal Medicine at the Mayo Clinic, Rochester. He is limiting his practice to Internal Medicine, in Chicago, and is associated with Drs. Arnold H. Kegel and Frederick W. Schacht. Dr. Daniels was formerly in practice, at Eveleth, Minnesota, from 1922 until 1927.

Members of the Minnesota State Medical Association, especially those who attended the Minneapolis Assembly of the Inter-State Postgraduate Medical Association of North America, will be interested to know that the published Proceedings of that Assembly are now available and may be procured through the office of the Executive Secretary, Dr. Edwin Henes, Jr., 759 North Milwaukee Street, Milwaukee, Wisconsin.

The Medical Alumni Association of the University of Minnesota will erect a suitable monument for the unmarked grave of Dr. Perry H. Millard, the first Dean of the Medical School. Dr. Millard was largely responsible for the organization and early development of the school and was also the author of most of the medical laws by which we are governed. Medical Alumni may send contributions for the fund to Dr. Donald Daniel, Treasurer, at 1453 Medical Arts Building, Minneapolis.

Dr. W. A. Fisher, who is president of the Chicago Eye, Ear, Nose and Throat College, and who is noted for his introduction of the Smith Indian method for cataract extraction, came to Minneapolis May 6 to see Dr. C. N. Spratt's method for the extraction of cataract. A luncheon was given at the Minneapolis Club by Drs. C. N. Spratt and Archa Wilcox, and was attended by thirty of the prominent ophthalmologists. Dr. Samuel Higgins, who read a paper before the Minnesota Academy of Ophthalmology and Otolaryngology, witnessed a demonstration of Dr. Spratt's method of operation later in the week.

Dr. Hyman S. Lippman has been appointed director of the St. Paul Child Guidance Clinic and has taken over the post made vacant by the death of Dr. M. L. Stiffler. Dr. Lippman received his medical degree at the University of Minnesota in 1919 and specialized in pediatrics. He was on the staff of the habit training clinics under the auspices of the Minneapolis Infant Welfare Society from 1923 to 1927 and then spent two years on the staff of the Institute for Child Guidance in New York City. Dr. Lippman comes to St. Paul from Vienna, where he spent eighteen months in the study of adult and child psychology.

Dr. Richard E. Scammon, during the present academic year dean of medical and biological sciences at the University of Chicago, will return to the University of Minnesota next fall to fill the newly created post of dean of medical sciences. Dr. Scammon was professor of anatomy at the University of Minnesota prior

to his going to Chicago in the fall of 1930. He has done much research work in comparative embryology and the growth and physical development of children, and is the author of several books on these subjects. In his new position he will be especially charged with the stimulation of research in medical science and related fields that requires the coöperation of the various colleges of the University.

### COOK COUNTY HOSPITAL CLINICS

The annual post-graduate summer clinics conducted by Cook County Hospital, Chicago, under the auspices of the Chicago Medical Society, will be held June 22 to July 3. Dr. N. S. Davis, III, Secretary of the Society, reports that the clinics will be organized to give the practicing physicians in attendance practical instruction in the line of medicine and surgery. In fact, the two weeks will cover an intensive post-graduate study of the latest modern medical developments. Cook County Hospital probably offers a better opportunity for such study than any other hospital in the country.

Medical men from all sections of the United States and Canada are expected to attend these clinics which will be held from 8:00 A. M. to 5:00 P. M. each day, and the lectures that will be given three nights each week at eight o'clock. Physicians desiring further information about this post-graduate course should write the Secretary of the Chicago Medical Society, 185 North Wabash Avenue, Chicago.

## MISCELLANEOUS

### TRAINING FOR MEDICAL RESERVE OFFICERS AT THE MAYO FOUNDATION, ROCHESTER, MINNESOTA, AND WASHINGTON UNIVERSITY SCHOOL OF MEDICINE, ST. LOUIS, MISSOURI

Through the courtesy of the authorities at the Mayo Foundation, Rochester, Minnesota, and the Washington University School of Medicine, St. Louis, Missouri, arrangements have been made whereby there will be given a period of fourteen days inactive duty training for Medical Reserve Officers without expense to the government. The dates of this training are as follows:

Mayo Foundation, Rochester, Minnesota, October 18-November 1.

Washington University School of Medicine, St. Louis, Missouri, November 8-November 22.

These courses present to Medical Reserve Officers a two-fold advantage: (a) Medico-military instruction; (b) Refresher course in professional subjects. The courses are so arranged that a Reserve Officer can devote his morning hours in any of the clinics or other purely medical professional studies he desires. The afternoon and evening hours will be taken up entirely with medico-military subjects. The custom of taking annual study courses has become so general among medical men that argument about its advantage is unnecessary. Furthermore, patriotic motives of a Reserve Officer in the interest of National Defense and his advancement in the military service have created a desire for periodic instruction in Medical Department Reserve matters. These two great medical centers have provided the ways and means whereby the two-fold purpose can be accomplished.

For the past two years inactive duty training to Medical Department Reserve Officers has been given during the fall months at the Mayo Foundation, Rochester, Minnesota, for a period of two weeks. The authorities of the Mayo Foundation provided the facilities, including instructors, offices, class rooms, etc., necessary to carry on the school. All expenses incurred, except the salaries of the members of the Regular Army, were borne by the Foundation. The Washington University School of Medicine has offered the same facilities, including clinical instruction in the various branches of medical practice and the clinical material, laboratories, museums, libraries of the school and lecture rooms without charge. A group of faculty members have volunteered to give instruction and hold clinics during the period of training.

At our first inactive duty training camp at the Mayo Foundation most of the students were Fellows of the Mayo Foundation, or otherwise connected with the Mayo Clinic. A few were physicians from other parts of the Corps Area, who profited by having the mornings free to devote to observation of the work at the Clinic. The attendance at this school for the first year was thirty-three (33). The following fall, 1930, another two weeks period of training was provided, with the same facilities as in the previous year, by the Mayo Foundation. Fifty-one (51) Reserve Officers received instruction during this training period. The school was originally established because of the difficulty in granting leave to the Reserve Officers at the Mayo Clinic for camp training in July because of the fact that this was the rush season at the Clinic. After conducting two of these camps the authorities at the Mayo Clinic summarized the advantages as follows:

*a.* A Reserve Officer in convenient periods of the year receives stimulating personal instruction along military lines.

*b.* It provides preparation for taking examination for the next higher grade.

*c.* It affords a Medical Officer the satisfaction of knowing he is better fitted for his present rank.

*d.* It provides for the combination of military training with a professional observation course at the medical center.

Great interest was shown in these two courses and many of those who attended emphasized the importance of such a course on account of the dual purpose offered a busy doctor, namely, training for the duties required of a Military surgeon and the opportunity for a refresher course in any specialty of medicine.

All applications for the course of training at the Mayo Foundation should be made to the Director of the Mayo Fundation through the Surgeon, Seventh Corps Area, and applications to take the course at Washington University School of Medicine should be sent to the Dean of Washington University School of Medicine through the Surgeon, Seventh Corps Area.

## ADDING INSULT TO INJURY—BRAZEN EFFRONTERY OF THE AMERICAN TOBACCO COMPANY

Has your quiet evening enjoyment of the radio ever been disturbed by the raucous voice of the Lucky Strike announcer, informing the world that "Luckies are kind to the throat"? Has your blood *boiled* because of the heat engendered by his slanderous pronouncement that "20,679 physicians have stated Luckies to be less irritating" to the throat and less likely than other brands of cigarettes to induce coughing? Have your respect for science and love of truth suffered under his deceitful, tricky, distorting use of the language of science to bolster up an alleged scientific treatment of tobacco to improve its quality?

Quite aside from its offensive character, as viewed by physicians, the Lucky Strike advertising matter is about the worst that the American business craze for blatant, impudent, false, not-quite-provable-lying advertisements has yet produced. Let us analyze the speech that is repeatedly broadcast and the wording of ads now appearing in daily papers like the New York Times and magazines like the Forum; publications that ought to be but are not above engaging in the spread of such deceptive and misleading material.

The statement that 20,000 physicians signed cigarette testimonials may be true, though we doubt it. But, if it be true that so large a number of educated men could be induced to "sign a blank check," the fact must not be overlooked that in this instance the signatures were secured by methods which smack of fraud. While we feel ashamed of the fact that so many of our brothers proved themselves "easy suckers," the advertiser who procures testimonials through deceptive procedures has little to be proud of or boast about.

The statement—"It's toasted! Everyone knows that heat purifies and so toasting removes harmful irritants that cause throat irritation and coughing"—is made to appear as evidence of a scientific fact, but is, in reality, nothing but a jumble of words covering three alleged facts which have no true relationship to one another. For instance: "Everyone knows that heat purifies." We might retort that everyone knows also that heat *destroys*. What reason is there to suppose that heating will purify tobacco? We may assume the answer would be that heat is destructive only when applied in an intense form, and that purification attends upon the use of heat in moderate degree. Very good, but if by "purifies" it is meant to imply that microörganisms—disease-producing germs—are destroyed, we respectfully submit that a considerable degree of heat is required for that purpose, repeatedly applied in the case of spore-bearing germs, and that the heat of *toasting is not sufficient* to accomplish the purpose. A very simple experiment can be tried in the kitchen. Would any bacteriologist testify that toasting a slice of bread will destroy pathogenic germs on or in that bread, and thus purify it? We think not. Which disposes of that alleged fact.

Perhaps germs were not meant; we admit they were not mentioned, but we are unable to think of any other form of purification that could have been alluded to in that statement. The second alleged fact (or is it a deduction from the previously alleged fact?) is that "toasting removes harmful irritants." What irritants? Bacterial, as referred to above, or chemical? If the claim refers to chemical substances, pray tell us what chemical irritant can be removed from tobacco by the simple process of "toasting." We have some knowledge of chemistry but need help to solve that problem.

Thirdly, it is stated that toasting removes "irritants that cause throat irritation and coughing." Again, may we ask what is the name and nature of these irritants (characterization of a single one will satisfy our personal curiosity) that irritate the throat and induce coughing? If the claim can be sustained, that smoking tobacco or cigarettes of any kind produces of itself a specific irritation of the throat and a characteristic cough, there are several thousand specialists in affections of the throat who will welcome proof thereof, and who will be particularly glad to be enlightened as to the specific nature of the irritant.

But that is not all—we had almost forgotten the greatest claim of all: "Everyone knows that sunshine mellows—that's why toasting includes the use of the Ultra-violet Ray." Ah! What a lucky strike! Ultra-violet rays (why not vitamins)—fads of the day—must be worked in to aid the old-fashioned toasting. "Sunshine mellows"—perhaps, but who has proved that it is the ultra-violet end of the spectrum that produces the mellowing effect, on fruit for instance, and what constitutes the mellowing of tobacco? Like Hashimura Toga, "We ask to know."

What, then, does our analysis show? In plain English, it shows that the bombastic radio announcement and the printed advertisements referred to are a tissue of falsehoods strung together in such an impressive manner as to deceive the simple-minded listener and reader, and the advertiser doubtless hopes that repetition of deceptive statements will give them the effect of truthfulness. And the medical profession is made to appear as endorsing all this tommy-rot.

What can we do about it? Shall we, 100,000 or more physicians, supinely submit to these nightly radio and daily newspaper insults of the Lucky Strike manufacturers, or shall we make some effort to suppress such advertising and to protect the public and ourselves against misleading, deceptive and slanderous broadcasting, whether by radio or printing?

You may recall that the old slogan of this same company—Reach for a Lucky Instead of a Sweet—was quickly withdrawn when the sugar trust aided the candy-makers in a demand for suppression.

—*Journal of the Medical Society of New Jersey*, February, 1931.

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**Do not forget the date of the American Medical Association meeting which takes place June 8 to 12, inclusive.**

# CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*
**Minnesota State Medical Association**
11 West Summit Avenue
**Saint Paul, Minnesota**

1. *Question*—About 1927, a young wife came to me complaining of "rheumatic" pains in the back and shoulders. She is very short, fleshy, weighs 165 pounds although only 5 feet 3 inches in height, very athletic, being able, when well, to swim a mile without effort. She has a history of having had "grippe" every year as long as she can remember. She has chronically infected tonsils which are adherent. No other diseases. Father has diabetes in a rather mild form. Mother died of carcinoma of breast. Brother and sister living. One brother died of tumor of pineal gland. The patient had her first baby in January, 1928, and her second in March, 1930. Since 1927 her "rheumatism" has progressed. Tonsils were removed in March, 1927. In 1928 she began to have pains in her knee joints and fingers. The only time she has not been bothered with joint pains was during the last pregnancy. So far the case seems perfectly clear but the peculiar part of it is that she has these pains in periodic attacks beginning regularly every ten days apart, at which time the knee joint swells and fills with fluid. The swelling is so severe that she can not walk except with great difficulty, and then in two or three days the swelling and pain are gone and she can walk as well as ever. There is usually slight tenderness for a day or two following. I have on two occasions drawn out an ounce or more of fluid from the knee joint and tried to grow the organism at the laboratory but without success. The fluid is clear, amber, and contains many leukocytes but we can not find any bacteria. In 1927 or 1928 a consultant saw her and thought she had a streptococcus viridans type of arthritis deformans and gave her large doses of sodium cacodylate intravenously without very much improvement. Salicylates had no effect. In the earlier part of her disease, the leukocyte count was from 12,000 to 20,000. It is never found below 11,000. The information I desire is this: Does a streptococcus type of arthritis cause periodic recurrence of pain without deforming effects? Have you any suggestions as to treatment? I am now using triple typhoid injections, starting with 12½ million and increasing the dose.

*Answer*—This type of patient has been recently studied at the University of Minnesota by Drs. Macnider Wetherby and B. J. Clawson. They find in one-half of their cases a positive blood culture of streptococci, usualy streptococcus viridans. After studying this group of patients with pain, tenderness, swelling, and disability of the joints with or without deformity, they came to the conclusion that many of them were atypical variations of the same process. Animals can be immunized against the organism by intravenous injections of streptococcic antigen. This causes the titre to rise without increasing the sensitivity as evidenced by skin tests. On this basis, they have treated a considerable number of patients and note that improvement follows in about 75 per cent. They believe that their treatment is not an atypical foreign protein reaction but think it is a more or less specific response. This type of infection, undoubtedly, has an allergic factor and the periodic symptoms of pain, tenderness, and swelling are in accord with such a belief. At the present time, Drs. Clawson and Wetherby are continuing their studies but are not yet ready to release the antigen for general use. I have asked them to get in touch with you in regard to the matter. It is our impression that your patient has a streptococcus viridans type of arthritis without deformity. Removal of foci of infection may or may not have any influence on the course of the disease as reinfection may take place from foci in the joints. You might continue to use triple typhoid vaccine or boiled milk although this treatment is not uniformly successful.

2. *Question*—When is the best time to operate on a spina bifida?

*Answer*—As a rule, if an operation can be done, it should be deferred until the child is able to stand the shock. Operations are usually attempted before the child starts to walk and possible injury results from bumping against things. In the interval, the parents will be able to see that a certain amount of progress (if paralysis is present) is taking place so that the operation is not blamed for any continuation of the process. If you would restate the case, we would perhaps be able to give you more definite information but, as a general rule, operation is deferred until just before the patient begins to get about with a possibility of injury.

3. *Question*—The patient is a single nurse, 21 years of age. She has complained of feeling tired for the past six months, lost eighteen pounds in weight, and runs a temperature of 99.5 to 100.5 but this is inconstant. No cough. She has had frequent colds the last winter with rather severe chest pains. No history of tuberculosis in her immediate family but one grandmother had tuberculosis. On physical examination, the chest does not show anything striking. Urine negative. Appetite good. No night sweats. An X-ray of chest revealed clear apices but moderate thickening of hilus. In addition, there is a slight increase in bronchial markings, especially in the lower lobes. The size of the hilus may be slightly exaggerated because the patient is slightly turned.

*Answer*—The absence of parenchymal findings is against the X-ray diagnosis of tuberculosis. In the absence of sputum, it is impossible to rule out tubercle bacilli which would be diagnostic. A positive tuberculin reaction would indicate tuberculous infection but might not have anything to do with the present condition. A negative reac-

*(Continued on Page 570)*

# REPORTS AND ANNOUNCEMENTS OF SOCIETIES

## MEDICAL BROADCAST FOR THE MONTH

### The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

*Speaker:* Dr. William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of June will be as follows:

June 3—Ringworm of Feet.
June 10—Toxemia of Pregnancy.
June 17—Erysipelas.
June 24—X-ray and Radium in Treatment of Cancer.

## THE RECENT STATE MEETING

A registration of more than nine hundred physicians, from all over the Northwest, with isolated representations from great distances, marked the successful Seventy-Eighth Annual Meeting of the Minnesota State Medical Association which occupied Tuesday and Wednesday, May 5 and 6, at the Nicollet Hotel in Minneapolis.

A day and a half of lectures at the hotel and a half day of clinics at the University hospitals constituted the scientific program of this meeting with George Gray Ward, Jr., of Cornell University, New York, and Drew Luten of Washington University, St. Louis, Mo., among the distinguished visiting speakers.

Officers elected at this meeting, to take office in January, 1932, were: M. S. Henderson, Rochester, president; B. S. Adams, Hibbing, first vice president; A. E. Hedback, Minneapolis, second vice president; E. A. Meyerding, St. Paul, secretary, and W. H. Condit, Minneapolis, treasurer. Herbert Giffen, Rochester, was elected councilor to succeed Dr. Henderson. Other councilors re-elected at the expiration of their three year terms included: H. M. Workman, Tracy; F. J. Savage, Saint Paul, and W. W. Will, Bertha.

One of the outstanding undertakings of the House of Delegates was the consideration of the report of the committee appointed last year to study the future policies of the Association. This committee presented its report for discussion before the Council, and both sessions of the House of Delegates, through its chairman, O. E. Locken, and was accepted with some additions and changes by that body.

Formation of another new committee to be called a Committee to Study the Problem of Medical Economics also marked the House of Delegates meeting at its final Wednesday session. In all, more than twenty committee reports were received and passed upon by the body.

The presentation of a watch to Dr. H. M. Workman, Tracy, in recognition of long and faithful service as president of the Council, was a surprise feature of the banquet on Tuesday evening. A crowd that seriously taxed the capacity of the hotel to accommodate it, attended. C. H. Mayo, Rochester, acted as toastmaster, the banquet program including, besides the presentation address of A. S. Hamilton, Minneapolis, the presidential address of L. Sogge, Windom, a talk by Mrs. James Blake, Hopkins, president of the Women's Auxiliary to the Minnesota State Medical Association, and Congressman W. I. Nolan of Minneapolis on "My Friend the Doctor."

St. Paul was selected as the place of the next meeting, the date to be decided later by the Council.

## AMERICAN PROCTOLOGIC SOCIETY

The thirty-second annual meeting of the American Proctologic Society will be held in Philadelphia, Sunday, Monday, and Tuesday, June 7, 8, and 9, 1931. The scientific sessions will be on June 7 and 8, and all members of state medical societies are cordially invited to attend.

## PAN AMERICAN MEDICAL ASSOCIATION

The third congress of the Pan American Medical Association will be held in Mexico City, July 26-31, 1931, under the auspices of the government of the Republic of Mexico.

The purpose of the Association is to promote a more intimate understanding between the medical men of North and South America. An effort is being made to further medical contacts between English, Spanish, French and Portuguese speaking physicians of Pan America, and a cordial invitation is extended to all physicians interested.

This meeting affords an opportunity for physicians in this country to pay a visit to our sister republic; a trip which has become more and more popular in the last few years.

Further information may be obtained by addressing Dr. Francisco de P. Miranda, Executive Secretary of the Organization Committee, Departmento de Salubridad Publica, Mexico City, Mexico.

## STEARNS-BENTON COUNTY SOCIETY

The annual meeting of the Stearns-Benton County Medical Society was held April 25, 1931, at the U. S. Veterans Hospital, St. Cloud. The Society was entertained at supper as guests of the hospital staff.

The following officers were elected to serve until January, 1933, since it was the sense of the meeting to amend the Constitution to end the fiscal year in December rather than in April as at present: Dr. William Friesleben, Sauk Rapids, president; Dr. Julian F. Du Bois, Sauk Centre, vice president; Dr. Wm. H. Rumpf, Jr., Saint Cloud, secretary; Dr. Francis J. Schatz, Saint Cloud, treasurer.

Censors: Dr. George E. Sherwood, Kimball, three

years; Dr. Richard N. Jones, St. Cloud, two years; Dr. William L. Freeman, St. Cloud, one year.

Delegate: Dr. John P. McDowell; alternate, Dr. John N. Libert.

Dr. R. H. Sweetman of Sauk Centre was unanimously elected an honorary member of the Society, having completed the requirements.

WILLIAM H. RUMPF, Secretary.

## MINNESOTA RADIOLOGICAL SOCIETY

The annual meeting of the Minnesota Radiological Society was held in Minneapolis May 4, 1931. The following program was presented:

ROUND TABLE DISCUSSIONS

1. Therapeutic X-ray Dosage and Measurement Problems. Conducted by
   Dr. E. T. Leddy, Rochester.
2. Gastric Ulcer
   Conducted by
   Dr. J. Richards Aurelius, St. Paul.
3. Traumatic Spine Lesions
   Conducted by
   Dr. Gage Clement, Duluth.
4. The Chest in Children
   Conducted by
   Dr. Malcolm B. Hanson, Minneapolis.

INFORMAL DINNER

ADDRESS: The Intervertebral Disc. Dr. Emil S. Geist, Minneapolis.

Pathologic and Roentgenologic Study of Joint Diseases, Dr. R. K. Ghormley, Rochester.

The present officers were re-elected for the coming year as follows:

Dr. B. R. Kirklin, Rochester, president; Dr. Gage Clement, Duluth, vice president; Dr. Leo G. Rigler, Minneapolis, secretary-treasurer.

LEO G. RIGLER, M.D., *Secretary-Treasurer.*

## RED RIVER VALLEY SOCIETY

The Spring meeting of the Red River Valley Medical Society was held in Crookston, Minnesota, April 14, 1931. The following program was presented:

1. Diathermy in Acute Pulmonary Diseases.
   DR. G. S. WATTAM, Warren, Minnesota.
2. The Office Treatment of Diseases of the Cervix, with Special Reference to the Cautery.
   DR. J. R. MANLEY, Duluth, Minnesota.
3. Advances in the Diagnosis of Heart Disease.
   DR. O. E. LOCKEN, Crookston, Minn.

C. L. OPPEGAARD, *Secretary-Treasurer.*

## UPPER MISSISSIPPI MEDICAL SOCIETY

A meeting of the Upper Mississippi Medical Society was held at Wadena, April 25, 1931. Papers were given by John F. Madden, of St. Paul, on "Diagnosis and Treatment of Common Skin Diseases," and by W. Ray Shannon, of St. Paul, on "Infantile Tetany."

F. W. VAN VALKENBURG, *Secretary.*

## INTER-STATE POST GRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

The next annual meeting of the Inter-State Post Graduate Medical Association will be held at Milwaukee, October 19 to 23, 1931.

The names of those who will take part in the scientific program have been announced and the coming meeting promises to be as comprehensive as the recent meetings have been.

For further information, the secretary, Dr. Edwin Henes, Jr., Milwaukee, may be addressed.

# WOMEN'S AUXILIARY
## *Minnesota State Medical Association*

**President—Mrs. S. S. Hesselgrave, St. Paul**
**Chairman Press and Publicity—Mrs. E. A. Meyerding, St. Paul**
**Editor—Mrs. A. A. Passer, Olivia**

A meeting of the State Executive Board of the Women's Auxiliary was held at the Nicollet Hotel, Minneapolis, Tuesday, May 5, following a luncheon in the main dining room. Dr. Kathleen Jordan of Granite Falls spoke on "Tuberculosis in Children—the Value of the Mantoux Test."

The annual business meeting of the Women's Auxiliary was conducted in the Hennepin County Medical Society Rooms of the Medical Arts Building, Wednesday, May 6, at 10:00 A. M. Dr. L. Sogge of Windom addressed the assembly. Other speakers included: Dr. W. A. Coventry of Duluth on "The Doctor Looks at the Auxiliary"; Dr. C. E. Rudolph of Minneapolis on "The Cost of Medical Care." Annual reports were given by officers, committees, and county auxiliary presidents.

Mrs. Edward Schons, St. Paul, was elected president of the Women's Auxiliary for 1932. Mrs. James Blake, Hopkins, who was elected last year, will serve as president this year. Other officers elected were: Mrs. R. N. Jones, St. Cloud, first vice president; Mrs. H. M. Blegen, Warren, second vice president; Mrs. J. W. Stuhr, Stillwater, third vice president; Mrs. E. M. Hammes, St. Paul, secretary; Mrs. W. A. Coventry, Duluth, treasurer; and Mrs. M. L. Mayland, Faribault, auditor. Article 3, Section 3, of the By-Laws, was amended to read: "Terms of office shall begin following the National Convention of the Women's Auxiliary to the American Medical Association."

Mrs. S. S. Hesselgrave will attend the National Convention of the A. M. A. Auxiliary as state president, and Mrs. James Blake will attend as a national officer, being second vice president of the Women's Auxiliary to the A. M. A. Minnesota is entitled to nine delegates to the national convention.

Mrs. Martin Nordland, Robbinsdale, was appointed treasurer during the absence of Mrs. W. A. Coventry, who will tour Europe during the summer.

The reports of committees were interesting and

showed the great interest throughout the state in the various social, philanthropic and educational activities sponsored by the auxiliary and approved by the doctors.

The luncheon on Wednesday, May 6, was served at the Woman's Club of Minneapolis. Mrs. Martin Nordland, president of the Hennepin County Auxiliary, presided. Speakers included Dr. William A. O'Brien and Mr. H. A. Bellows. A musical program was given by the Thursday Musical Ensemble, under the direction of Mrs. C. Jay Willcox.

The Women's Auxiliary coöperated with the Minnesota Public Health Association in the High School radio broadcasts by offering a Silver Cup for the best radio talk. The cup was awarded to Eugene Lambert of Cloquet and honorable mention to Arnold Lawson of Owatonna, by Mrs. Hesselgrave, state president.

The annual banquet of the State Medical Association and Women's Auxiliary was held at the Nicollet Hotel, Minneapolis, Tuesday evening, May 5. Dr. Charles H. Mayo of Rochester was toastmaster. The address of welcome was given by Dr. S. H. Baxter, president of the Hennepin County Medical Society. Speakers included Dr. L. Sogge, president of the State Association, Mrs. James Blake, president-elect of the Women's Auxiliary, Dr. A. S. Hamilton of Minneapolis, and the Honorable W. I. Nolan of Minneapolis.

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May 6, 1931

PRESIDENT'S REPORT

Ninth Annual Meeting—Women's Auxiliary to the Minnesota State Medical Association

Our brief year has come to a close and the report of our activities will soon be filed away with the record of other years. It has been a privilege to serve as president of the State Auxiliary because of the loyal support given me by the Executive Board in carrying out our program and I most sincerely thank the officers, the Committees and the County Auxiliary presidents for their kind and courteous coöperation.

The following have fully earned and receive our highest commendation:

The Organization Chairman, Mrs. James Blake, who has sown seed for new auxiliaries in every corner of the State, of which the harvest of new members has been bountiful. We take the greatest pleasure in welcoming these 210 new members of our State Auxiliary and in wishing them success in their work and happiness in the new friendships to be formed.

Mrs. Hugh Tunstead and her Legislative Committee for the discretion and vigilance exercised during the past legislature.

Our Public Relations Chairman, Mrs. Davis, for a tentative program that our advisors have prepared for auxiliaries who wish to study the most recent developments in medicine.

Our Press and Publicity Committee in the capable hands of Mrs. E. A. Meyerding, with the valued cooperation of the office of the Minnesota State Medical Association in this field.

Mrs. A. A. Passer, our Editor, who has filled many columns with colorful Auxiliary news. MINNESOTA MEDICINE for the valuable space given, and its Editor, Dr. Carl Drake, for his editorial "The Women's Auxiliary," published in the December number, which has been copied by eastern journals.

Mrs. Carl Larsen, Finance and Budget Chairman, Mrs. Murdoch, *Hygeia* Chairman, Mrs. C. C. Chatterton and Mrs. Peterson, Hospitality Chairmen, and their committees.

Our parliamentarian, Mrs. W. J. Byrnes, who for a number of years has held before us the "Rules of Order," has kept a gracious if rigid count of our parliamentary errors. We respect her opinions, adhere to her decisions and we appreciate her devotion.

Our advisors, Drs. E. A. Meyerding, C. B. Wright, and George Earl, who have kept our course free from entanglements. We urge all county auxiliaries to request the appointment of advisors from their Medical Society. Drs. Sogge and Meyerding for addressing our meetings, and Drs. Critchfield and Hensel for their radio talks.

Our secretaries, Mrs. Boleyn and Mrs. Schons, and our treasurer, Mrs. Coventry, and the auditor, Mrs. Catlin, all deserve unstinted paise.

In November, I had the pleasure of attending the National Executive Board meeting in Chicago, where I met the national officers and presidents of other states. From this meeting I brought back a national viewpoint in Auxiliary work and added enthusiasm for the Women's Auxiliary.

In February I gave a brief talk on "Uses of the Auxiliary" at a Symposium on Public Relations; in March a five minute talk during a Health Radio broadcast over WCCO during Federation hour.

I have been the guest of the following County Auxiliaries: Washington, Wright, Rice, St. Louis, Hennepin and Ramsey. I thank them for their kind hospitality and assure them that I enjoyed their meetings, their reports and their social activities and their courtesy in inviting me.

It was my good fortune to be called upon to cooperate with the Organization Committee in the forming of new auxiliaries, and through the kindness of Mrs. Schons and Mrs. Hewson, who offered their cars, we travelled many hundreds of miles on our quest for new groups during our intensive campaign. We thank Mrs. Braasch of Rochester and Mrs. Lommen of Austin for their kindness to us during our visit in their homes.

I sent out many form letters and wrote hundreds of personal letters that have brought the county auxiliaries in closer contact with the state and national organizations. Our revised Constitution has been printed and distributed. The Treasurer's files have been completed and the Treasurer's receipt forms have been used by all the local treasurers. We thank these patient workers and our Treasurer for her efficient handling of this innovation that has been a revelation as to accuracy of record.

I am sure that the entire State Auxiliary wishes to join me in conveying our sincerest thanks to the capa-

ble committees who have worked to make our present stay in Minneapolis so pleasant, and to present our homage to the distinguished president of the Hennepin County Auxiliary and to her entire Auxiliary we say, "Well done, dear friends and neighbors."

In parting I would offer the following recommendations: Have advisors appointed from your Medical Society. Notify the president of a change in officers immediately after their election to office. Collect your dues by January first each year. Adopt a program of activities that help the doctor. Exercise eternal vigilance over the health programs offered by your women's organizations. Do not neglect the social side—it is most important that pleasant relations be established among doctors' wives. Give your new officers the staunch support you have given me.

This is the end of a happy year. To all my coworkers I bid not "adieu" but "Au revoir," and again I thank you.

Respectfully submitted,
(Mrs. S. S.) MARIE E. HESSELGRAVE, *President.*

## PARK REGION AUXILIARY

The Women's Auxiliary met at the home of Mrs. W. W. Drought of Fergus Falls, Wednesday, April 8. At the business session it was suggested that the Auxiliary obtain a speaker from the State Medical Society to speak to the public, in May. A committee was appointed to arrange for the midsummer meeting.

## RICE COUNTY AUXILIARY

A meeting of the Rice County Women's Auxiliary was held in Northfield, April 16, at the home of Mrs. Neil S. Dungay, with Mrs. Orin P. Thorson as assisting hostess. A short business meeting was held and the remainder of the afternoon was spent in sewing for the Red Cross. Refreshments were served at four-thirty, followed by a social half hour.

## RESEARCH FOR A NON-HABIT-FORMING SUBSTITUTE FOR MORPHINE

The Committee on Drug Addiction of the National Research Council announces a large collaborative research in alkaloidal chemistry by chemists and pharmacologists of this country. Apparently the present object of the Committee is to prepare a non-habit-forming substitute for morphine that will yet possess the desirable action of morphine. (Jour. A. M. A., March 14, 1931, p. 863.)

## CONSULTATION BUREAU

*(Continued from Page 566)*

tion would aid more in the diagnosis but would not be absolute. Physicians who limit their work to diseases of the chest find cases of this sort rather common. The differential diagnosis is between a non-tuberculous respiratory infection and tuberculosis. Information available to date would seem to indicate the possibility of the former but does not absolutely rule out the latter. She should be watched from this standpoint and other sources of weight, loss, fever, and fatigue kept in mind.

# PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of April 8, 1931

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, April 8, 1931. Dinner was served at 7 P. M. and the meeting was called to order at 8 P. M. by the President, Dr. J. S. Gilfillan. There were forty-seven members and two visitors present.

Minutes of the March meeting were read and approved.

Dr. A. S. Hamilton read the following Memorial to Dr. W. A. Jones:

DR. WILLIAM A. JONES died at the Northwestern Hospital January 15, 1931, at the age of 71 years, of which forty-eight were spent in Minneapolis. He was a very active man and in the course of his long life had an important part in many activities. In addition to his private practice, he was for many years a teacher in the School of Medicine at the University; he was on the staff of various hospitals, including a heavy service at the Minneapolis City Hospital for years; he was for thirty years editor of the *Journal-Lancet*, and an active member of the State Board of Health for twelve years. In addition to these, he had time to cultivate an extensive acquaintance among medical men, to give many public addresses and to write many articles. If, as Osler put it, the principal centers of a medical life in a city are the medical school, the hospital, the medical library, the medical society and the medical journal, then Dr. Jones was certainly prominent in every field of medical activity.

His parents were of Scotch and Welsh ancestry. Both his paternal and maternal grandfathers served in the Revolutionary War. His father came to St. Peter in 1854 and his mother in 1858 and both suffered the privations of pioneer life and the horrors of the Indian outbreak of 1862. Dr. Jones was born in 1859.

He attended grade school and high school in St. Peter and when only fourteen years old entered his father's drug store as a clerk and there gained a thorough and practical knowledge of drugs. He later studied medicine at the University of the City of New York and was graduated in 1881 and directly afterward became assistant physician at the State Hospital for the Insane at St. Peter. In 1883 he came to Minneapolis and practised general medicine until 1886, when, after his marriage to Annie R. Johnson of Denver, he went to Europe and took special work in nervous and mental diseases at Berlin and Vienna. On his return to Minneapolis, he began special practice and soon attained a prominent position in the field of nervous and mental diseases, which he retained to his death.

In his lifetime he held many prominent positions, both local and national. At different periods, he served on the staff of the Northwestern, the Minneapolis City, the Asbury, the St. Mary's, the Swedish and the Norwegian Hospitals. In 1913, he founded the South Side

Sanitarium and maintained it as a private hospital almost to the time of his death.

He was a member of the Hennepin County and the Minnesota State Medical Societies and of the Minnesota Academy of Medicine, and had been president of all three. He was also a member of the American Psychiatric Association, and of the American Neurological Society, and was a charter member of the Central Neuropsychiatric Association and of the Minnesota Neurological Society and was president of the latter. He was an active member of the American Medical Association, was Chief of the Section of Nervous and Mental Diseases in 1914, and in 1928-29 served as Vice-president of the Association.

By the very nature of his calling, a physician is more or less a public character. Throughout his professional life, Dr. Jones was deeply interested in the preservation of health and the prevention of disease. On January 1, 1906, he was appointed a member of the State Board of Health and served as such to December 31, 1918, being president from January 10, 1911, to December 31, 1918. During his term of service in the course of some tempestuous activities, he was a loyal supporter of Dr. Bracken as secretary, and particularly so during certain difficulties which arose in the legislative session of 1917 and which resulted in failure to reappoint Dr. Jones. The character of his work on the Board is indicated by the statement of one of its officials that he was a masterful chairman, and, with his sense of humor, his absolutely frank attitude toward all questions and his prompt action, he was the most accomplished and the most efficient member the Board ever had.

In 1890 he was appointed by Governor Nelson a member of the Board of Trustees of the State Hospitals for the Insane and held this position until 1894.

He was Editor of the *Northwestern Lancet* and of the *Journal-Lancet* from 1901 to 1931 and no one who knew him well could doubt his deep interest in and genuine affection for this publication. The Journal catered to the special medical activities and interests of a limited geographic area and Dr. Jones' editorials were its most striking feature. Many medical men have been heard to say that they subscribed to the *Journal-Lancet* for W. A.'s editorials. To most men, the preparation of a series of editorials every two weeks would be a real task. To Dr. Jones it was a labor of love, quickly performed. Without a note at his command, the editorial was dictated as the ideas flowed from his mind and if it had any further corrections they were made at the hands of the stenographer or the publisher. That he had the confidence of the medical profession in his undertaking is shown by the following list of contributors to the first number: Drs. Frank Allport, James H. Dunn, James E. Moore, H. L. Staples, R. O. Beard, and A. T. Mann.

As a clinical teacher of neurology and psychiatry he was always a favorite among the students and out of a very ordinary patient he could always make an interesting case. Though never a profound clinical investigator, he could quickly see the outstanding clinical features of his case, and his diagnosis, whether in the clinic or in private practice, though often of the snapshot type, was generally correct. In 1889 he was made instructor in Nervous and Mental Diseases at the Medical School of the University, became professor in 1900 and served as such to his retirement in 1919. During the Great War he again took up the duties of a teacher in the Medical School in the absence of the regular staff, and also served as a member of a medical advisory board during the war.

Dr. Jones had a large collection of books, both general and medical, and in the later years of his life in particular, when he was often confined to his room for short periods, the writer always found him with stacks of books about his bed. Throughout his life reading was his greatest hobby. His medical library he left to the Hennepin County Medical Society, to which he had contributed liberally throughout his life.

As a practitioner in functional nervous and mental diseases, Dr. Jones was more than ordinarily successful. Possessed of a dominating personality, he impressed his ideas on patients to a very unusual degree and with his charactristic optimism and abounding vitality he inspired them with new hope and courage. Though brusque at times and very blunt, he was always forceful in his relations with patients who accepted his advice and followed his directions as best they could.

Always very fond of music, for many years he had in his own home a pipe organ which he played with much pleasure and he used to tell how he contributed to his scant income, in the early period of his profession, through his musical ability.

All his life he was a hard worker and he had few vacations—the last in 1921—and such as he had were purely urban. He cared nothing for fishing, hunting, or motoring, and his ideal vaaction consisted in a trip to New York, where he spent his days on the top story of a hotel reading and his evenings at the theater. He had a high intelligence and a ready wit and repartee, and was always popular at medical meetings, where he often presided, easily and ably. To the very last he carried with him his unquenchable courage and cheerfulness and his refusal to accept the rôle of an invalid.

He is survived by his wife and a sister, Mrs. J. W. Bell.

Signed: Arthur S. Hamilton,
H. B. Sweetser,
E. M. Hammes,
*Committee.*

The scientific program was as follows:

Dr. E. M. Hammes (St. Paul) reported a case of Progressive Muscular Atrophy with Initial Involvement of the Upper Spinous Muscles gradually extending to the Scapulo-Humeral Group, with Respiratory Phenomena. The patient was presented.

The patient was a male, 59 years of age, married, a resident of St. Paul. His family history is negative. His personal history shows that he had dropsy in 1893 and an appendectomy thirty years ago. He neither smokes nor drinks. His wife and two children are living and well. She has had no miscarriages.

He stated that for many years his throat has been

unduly sensitive to dust and irritating substances. A year ago he had an attack of bronchitis which was relieved somewhat by steam inhalations. Since that time he has had an occasional feeling of tightness in his throat but no obstruction. He paid very little attention to this because it occurred seldom and lasted only a few minutes at a time.

On February 26, 1931, he had a double herniotomy under spinal anesthesia. He did not notice anything until about four days afterward, when he began to have trouble in breathing. There was a great deal of inspiratory weakness but no obstruction. He stated that it felt as if his chest were one great big empty space and that he could not fill it with air. There was no change in his voice, and swallowing was normal.

The inspiratory difficulty has become more constant of late. At first it was intermittent and worse at night. Now it is almost constant and least noticeable when he is lying on his back. When he gets up in the morning and bends over it is most troublesome.

His general physical condition is somewhat below normal. His weight is less than it was a year ago by about 8 pounds. His appetite is fair, his bowels regular, and he sleeps well. He has had arthritic pains in his shoulders and hips for the past few years.

X-rays of his chest show that the diaphragm extends high up bilaterally. His arms feel weak, especially in the shoulders. This has been present for the past year. He has had a feeling of weakness and soreness in both gluteal muscles for the past nine months. In the past two years he has developed some scoliosis and his shoulder blades stick out more than formerly.

The physical examination shows that he has many teeth missing and there is slight evidence of pyorrhea. There is fairly marked winging of the scapulæ.

The neurological examination shows that the pupils, cranial nerves, and fundi are normal. The upper extremities show bilateral atrophy of the shoulder girdle, upper arm, chest and spinous muscles, especially in the upper dorsal region. There is marked coarse fibrillary and fascicular tremors over all these muscles and some slight fibrillary tremors of the gluteal muscles. The muscle strength is impaired and expansion of the chest is limited. The deep reflexes in both upper extremities are present but somewhat reduced. Both lower extremities show normal knee and ankle jerks. There is no ankle clonus or Babinski, and no evidence of atrophy. The muscles in the gluteal region seem to have a little less pronounced tone than those of the other lower musculature. The abdominal and cremasteric reflexes are normal. Sensation is normal throughout. He has quite a marked kypho-scoliosis. The Romberg is negative.

His hemoglobin is 85 per cent; blood pressure 148 systolic, 96 diastolic. Urine is normal.

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DR. HORACE NEWHART (Minneapolis) read his Inaugural Thesis entitled, "Recent Advances in Deafness Prevention," and demonstrated the use of the audiometer.

DR. W. F. BRAASCH (Rochester) read a paper, and showed numerous X-ray films, on "Intravenous Urography."

DISCUSSION

DR. E. L. GARDNER (Minneapolis): What precautions, if any, do you take against reaction in this procedure?

DR. BRAASCH: I have never seen any systemic reaction in any of these patients when using skiodan.

DR. GILBERT THOMAS (Minneapolis) (by invitation): I wish to thank the president for the privilege of listening to Dr. Braasch's paper as a guest of Dr. Foley and the Academy of Medicine.

In discussing Dr. Braasch's paper and the conclusions which he has drawn, one must remember he has had a wide experience, and has examined thousands of pyelograms. I was a student with him when he was compiling data for his book on urography, and I know the immense amount of material he reviewed before publishing the book. The same has been true in his experience with skiodan and intravenous urography.

As Dr. Braasch has told you, obstructions in the ureter or any condition which prevents the normal outflow of urine from the kidneys and through the ureters will make a very good urogram after intravenous injection of skiodan. Intravenous urography will orient shadows supposed to be stones in the urinary tract. The size and position of the kidney, together with the identification of masses in the abdomen in relation to the kidney, may be made with skiodan, or intravenous urography.

This drug, which contains a large amount of iodin, is contraindicated when the combined renal function is low. Definite harm may occur in the presence of marked renal insufficiency if it is used.

The technic of intravenous injection should be carefully learned by any one who proposes to use intravenous urography. Much harm and discomfort to the patient may occur if care is not used in the preparation of the water and the solution which is finally introduced into the vein.

When iodin-containing drugs were first used we believed they were contraindicated in the study of tuberculosis of the kidney. However, after chemical analyses by the Mayo Foundation, we learned that Skiodan is eliminated in just the same form as it is given, so that no free iodin is found in the blood stream.

Intravenous urography is particularly helpful when it is impossible to introduce a cystoscope into the bladder. Sometimes this occurs in children. In severe cystitis, particularly tuberculosis, this method of examination is useful, as well as in traumatic conditions of the ureter or bladder. Many times intravenous urography is the only method which can be used for making diagnoses in the types of cases just mentioned.

Intravenous urography, then, is just another method of accurate diagnosis, and should be used as such. I think this point should be emphasized so that physicians and surgeons who have not heretofore interpreted urograms and who have not taken careful histories and obtained other data that is necessary should not use the

intravenous urogram as the only criterion for making positive diagnoses.

Dr. S. M. White (Minneapolis): I would like to ask Dr. Braasch how long before the uroselectan or skiodan is given do you cease giving water; in other words, how many hours before the intravenous injection is water interdicted?

Dr. S. E. Sweitzer (Minneapolis): I would like to ask Dr. Braasch if he has seen any cutaneous eruptions from the use of this iodin preparation. Practically every drug that has been administered will occasionally give an eruption on the skin. I have seen some articles that stated uroselectan had caused some skin eruption.

Dr. F. E. B. Foley (St. Paul): Dr. Braasch's opinion and appraisal of this new method are extremely valuable. Most of us have had insufficient experience with it to permit forming so valuable an opinion.

I was gratified to find him so guarded in praising intravenous urography. When I first read Swick's paper, I thought I would have to give up urology in favor of something else, for it appeared that intravenous urography was going to eliminate the cystoscopist. Experience has not borne this out. Those of us who are using it regularly are becoming more and more aware of its limitations. It appears now that the most significant accomplishment of intravenous urography is going to be the easy fereting out of a greater number of obscure urologic conditions that will then be submitted to the more comprehensive study possible by cystoscopy, and the more accurate interpretation permitted by a direct pyelogram.

I endorse enthusiastically all of what Dr. Braasch said, with one exception. Unless I misunderstood him, it was said that in the case of an obscure abdominal condition intravenous urography may be used to exclude the upper urinary tract as a cause. That has not been my experience. I would say that positive findings by intravenous urography may be of extreme value in showing the kidney or ureter to be the cause, but negative findings cannot be relied upon. With the rather poor pyelograms so obtained, it is not possible, for example, to exclude kidney tumor, renal tuberculosis, or slight obstructions.

Dr. Braasch brought out a point which I would like to emphasize. By comparison with direct pyeloureterograms, these are poor pictures in point of interpretive value. He showed from the same case both an intravenous pyelogram and one made by the direct method. It was very obvious, when viewed together, that the intravenous pyelogram suffered tremendously by comparison. When it comes to refinements of interpretation, the very best pyelogram we can get is none too good. Intravenous pyelograms usually fail to show the deformities of early neoplasm, early tuberculosis, small cysts, slight obstructions and changes in the ureter. Accordingly, the negative findings from them have little value.

When it comes to grosser things, such as localization of stone and recognition of obstructions causing well-marked dilatation, the method is of considerable value. With the exception of these two conditions its value is extremely limited in the general run of upper urinary tract conditions.

Dr. Braasch covered the whole field so thoroughly that it is difficult to discuss the subject without repeating the things he has already said. However, there is one more point I would like to repeat and enlarge upon. A use of intravenous urography which appeals very strongly to me is its employment in cases of bladder-neck obstruction. The information we get from phthalein tests and blood chemistry determinations tells us the functional power of the kidney at that particular time. A low phthalein excretion and nitrogen retention may be due either to mere temporary functional block or to extensive and permanent anatomic change. By phthalein tests and blood chemistry determinations we learn nothing of the obstruction and dilatation of pelves and ureters that occur with long-standing vesical neck obstruction. These changes are particularly well disclosed by intravenous urography. Accordingly the method permits us to more accurately appraise the surgical risk, to know the ability to recover function and to judge in advance how long a period of drainage will be required to attain the maximal degree of functional improvement before the operation is undertaken.

Dr. Braasch (in closing): In preparing the patient we simply request that as little fluid as possible be taken for twelve hours prior to urography.

When we used a fifteen per cent solution of sodium iodide for intravenous urography we observed a number of patients with severe skin eruptions caused by iodine absorption. Since using iodine organically combined, as in uroselectan and skiodan, I have not observed any skin reaction.

Dr. Thomas is quite right in statements regarding the difficulties of technic involved. The question may well be asked, who is best equipped to make the intravenous urogram? At the meeting of the American Roentgen Ray Society, which I attended last fall, it was very interesting to find that there were a number of roentgenologists who announced that they were equipped to do intravenous urography. There should be no competition between the roentgenologist and the urologist; they should combine their resources. This is also true of the urologist and the general practitioner. The technical difficulties in the hands of a man accustomed to intravenous manipulation are not many. The greatest difficulty may be found in interpretation.

Although intravenous urography may be of much value in general diagnosis in many ways, it will be of greatest use in that it offers a simple method of recognizing hydronephrosis, which is so frequently overlooked. It will also be of great assistance in the recognition of stone in the kidney and ureter. I do not use the cystoscope now in many of these cases, for, with the evidence that the intravenous urogram offers, there is no object in cystoscopy. It will be a valuable factor in preventing the general man from overlooking lesions of the urinary tract in differential diagnosis.

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The meeting adjourned.

R. T. LaVake, M.D., *Secretary*.

# PROCEEDINGS OF THE MINNEAPOLIS SURGICAL SOCIETY

Meeting of April 2, 1931

The regular monthly meeting of the Minneapolis Surgical Society was held at the University Hospital on the evening of April 2, 1931. The members of the Society were guests of the Superintendent and Surgical Staff of the Hospital at a 6:30 dinner in the Nurses' Dining Room, after which they adjourned to the Todd Ampitheater for the scientific program, which was a clinical meeting presented by various members of the Surgical Staff. Dr. O. H. Wangensteen, Chief of the Department of Surgery, presided. There were thirty-one members of the Surgical Society present.

The Scientific Program was as follows:

DR. H. P. RITCHIE (St. Paul) said that Dr. Waldron and he had been trying to develop a clinic on plastic surgery to deal with the reconstruction of the various congenital deformities and those that had resulted from traumatism from various causes. A great part of the work still deals with the deformities of the face, generally called "harelip and cleft palate." The first question usually asked is the cause of these deformities. Dr. Ritchie said that they are now looked upon simply as embryonal defects which showed failure of union of the several embryonal processes and that he had collected cases from his own files and from the literature to show that they are only a part of a large group of process failures, not only in the lip but of the nose, the face, and the lower lip and jaw as well.

*Case 1.*—In this case the right and left maxillary embryonal processes have failed to unite with the median embryonal process which makes up the nose, prolabium and pre-maxilla. The difference between this case and the normal baby is that in the latter all the divisions have come together, while here they are all apart.

*Case 2.*—The pre-maxilla has been replaced in relation to the maxillary processes and the lip has been done by bringing the muscles underneath the skin and in front of the mucous membrane of the prolabium, the mucous membrane of which has been incorporated in the vermilion border of the lip. The body of the lip is coming out pretty well, but there is still trouble with the nostril. Dr. Ritchie said that the nostrils usually look alike in these cases although they may not be what the baby is entitled to.

*Case 3.*—This is a single harelip and cleft palate—the most frequent type of case with these various combinations. The alveolar process is not yet closed. This lip was done elsewhere and evidently was repaired without due effort to close the cleft in the bone; and, as can be seen, the nostril is very wide and flaring.

*Case 4.*—This is the same combination as Case 3, but the bone is in position and the nostril and lip, while not perfect, is a great improvement over the one just shown. Dr. Ritchie said that the technical details of the repair of the lip are the most controversial questions in surgery, but surgeons are gradually coming to the conclusion that the steps involve the consideration of two principles, one dealing with the active tissues of the body of the lip and one with the inactive tissues about the nostril.

*Case 5.*—This baby was operated on last Monday and the lip was repaired on the theory that the opportunity for future growth and development of this lip required the exact approximation of the muscle elements of the lip; so it was built puckered up, as you can see. The reason for this is that every lip has the physiological function of whistling and that this is the end-result of the action of all the muscle elements and, if these babies can be given the power to do this, presumably the other odd function of these elements of the lip will naturally follow.

Dr. Ritchie then showed a group of cases for the use of skin grafts and the repair of various contractures. One group, and the one most important from the standpoint of function, include the contractures about the joints. In the consideration of these cases there is a great difference between involvement of the flexor and extensor surfaces. In the former, of course, the deeper tissues must be definitely considered because there are more essential structures placed there than in the latter.

*Case 6.*—This boy was burned over a year ago, and Dr. Ritchie said it has taken practically all the time since to cover this enormous area, which, as could be seen, involved the right arm, the axillary space, the shoulder and on to the chest. The consideration of these enormous granulating surfaces is one of the very great problems in this field, not only from the standpoint of the patient but from the economic side of the case. The arm was put on an airplane splint and was extended, but even with all this preliminary care he has contractures at both folds of the axilla and a very extreme contracture at the elbow joint. The only thing which had been done for the patient so far was to skin-graft the shoulder, on which a full thickness skin graft was used. This was placed upon the granulating surface with a complete "take" and with a smooth area which approximates the normal skin. The rest of the area was grafted by the small deep graft suggested by Dr. Davis of Baltimore. Dr. Ritchie said this has no comparison with the full thickness graft in the nature of the cosmetic result, but, as could be seen, it has developed a definite epithelial covering. He said the next step in this case was to release the contractures at the axilla and also the release of the contracture at the elbow joint. In the latter there is greater opportunity than anywhere else for having involvement of the deeper structures; normally the elbow joint has the thinnest epithelial covering and it is not an uncommon thing to find that the contracture is due to deep-set adhesions about the joint; and sometimes it is necessary to elongate the biceps tendon, which, over such a long period as in this case, may be very definitely contracted. Hence, on the flexor surface of the elbow joint and the popliteal space, operations may develop into major procedures. Dr. Ritchie said as yet he had not studied

this particular case sufficiently to be in a position to say what is necessary to be done to this joint.

*Case 7.*—This girl's arm was bound down to her side by wide scar bands over the thorax and she also had contractures at the axilla. A large contracture at the neck was taken care of and beautifully done by Dr. Waldron on the plan of the Z-plasty. By extension, the scar tissues are raised up into a band above the surrounding tissues. The band is then bisected and two flaps made. Then, by cross incision, flaps are made which, by fitting the flap on one side into the raw surface of the other, permit of increasing by at least fifty per cent the distance between the two ends of the contractures. Z-plasty was also done on the thorax. In this instance six flaps were cut and placed.

*Case 8.*—This case falls in another interesting group of the congenital deformities involving the consideration of moles, angiomata and tumors. This boy had an enormous mole involving the left eyebrow, one-half of the forehead, and extending upward beyond the hair margin. Dr. Ritchie said that to remove this mole and substitute a full thickness skin graft would exceed the possibilities of tissue transference; and while the full thickness skin graft is a wonderful adjunct it has some limitations as regards size. In this case the mole was diminished in size by successful partial excisions, and, in so doing, consideration was taken of the elasticity of the surrounding skin. On three occasions a full inch was removed along the middle of the mole, the tissues were undermined and the wound sutured. By so doing, it was possible to diminish the size of the mole to a point where it was possible to substitute a full thickness graft for the diseased tissue. The position on the forehead is one of the most favorable sites for a successful result because the bone of the forehead presents resistance to pressure of the graft and permits of perfect fixation, which, in Dr. Ritchie's opinion, is essential to success.

*Case 9.*—This case is one of contracture on the dorsum of the hand. The fingers were thrown back to a point impossible to illustrate at this time. The scars were removed and a full thickness skin graft substituted.

Dr. Ritchie said this was the third case of the full thickness skin graft which he had presented this evening—the one on the shoulder on a granulating surface, the one on the forehead, and this one on the hand; and in each one of these cases the graft presented the appearance of normal skin.

*Case 10.*—Dr. Ritchie said there had been several cases of lye burns about the mouth. This young lady had a resulting contracture to a point where it was impossible to put a spoon in the mouth. The plan of repair of this case was to break this circular band in two places. Dr. Ritchie said he had found that a single incision into a contracture would result in a condition that is even worse than the original, but if the band is broken in two or three places the tissues in between the incisions tend to re-vascularize and, even though there is a scar, the tissue will take on the aspect of normal skin. In this case the first step was to break this circular band, which was done at each angle of the mouth. Then the scar tissue was rearranged on the principle of the Z-plasty, with material improvement in the case. The patient then returned for a second operation and the bands of scar tissue were removed by the cut-and-suture method, with the result, as could be seen, of a full open mouth. The patient still had a band on the inside of the mouth which Dr. Ritchie said could be sectioned and a Thiersch graft placed on a mould. He said they had found that a Thiersch graft placed in the mouth will take on the aspect of mucous membrane although, of course, it will not secrete.

DISCUSSION

Dr. Willard White (Minneapolis) asked if this would also apply to the mucous membrane of the urethra.

Dr. Ritchie said he had just completed reconstructing a male urethra with a flap from the scrotum.

Dr. White asked if a Thiersch graft or a thin layer of epithelium were applied to the urethra it would take on the function of the mucous membrane.

Dr. Ritchie replied that he really did not know but he presumed it would if it could be fixed in position. A Thiersch graft can be used for the enlargement and lining of the nostril, but with the urethra he thought the problem would be to fix it in position until healing took place.

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Dr. Carl W. Waldron (Minneapolis) presented the following patients:

*Case 1.*—Bilateral Resection of a Portion of the Mandible for Protrusion. This young man had a very marked protrusion of the mandible and had but two teeth that came in contact. A bilateral resection was done. There is now satisfactory occlusion and the patient has a good strong jaw. The wires are still in place but the twisted ends have been removed.

*Case 2.*—Restoration of the Cheek by a Skin Graft Lined Neck Flap. Stage 1. This patient has a pocket in the neck and one can see the skin graft lining of the pocket. The outline of the neck flap could also be seen. This condition is postoperative from carcinoma of the cheek. About six months ago the patient was unable to open his mouth because of an extra-articular ankylosis of the jaw due to scarring. This had been relieved by dividing the scars and skin grafting to prevent recurrence.

*Case 3.*—Restoration of the Cheek by a Skin Graft Lined Neck Flap. In this patient a flap from the neck was used to restore a large defect in the face. A double surface skin graft was first buried in the neck, as in Case 2. The cheek defect was acceptably closed by the flap, but it had been reopened along its upper border to give better access to an area of recurrence of the carcinoma.

*Case 4.*—Total Restoration of the Nose by the Forehead Flap. Stage 1. This flap as outlined has been raised and replaced on the skull on two occasions in order to make it better able to maintain its vitality with a considerably reduced arterial supply and venous re-

turn. The alæ could be seen on the flap. The extremity of the flap would be used to form the columella and line the vestibule.

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Dr. William T. Peyton (University Hospital) presented a follow-up study of "Cases of Cancer of the Rectum Treated at the University Hospital Since 1924." Seventy-seven patients were found to have been treated from the beginning of 1924 to the present time. The present condition of every case had been determined. Twenty-two of the patients are now living. Lantern slides were shown giving the date of admission of each patient and his subsequent course. Lasting freedom from recurrence is most apt to follow the combined abdomino-perineal operation, and seventeen patients were operated upon by this method (Coffey operation performed). Four of these are still living: one 7 years, one 5 years, one 4 years, and one 3 years. However, the mortality by this procedure was high; in the 17 operations of this type there were 7 postoperative deaths. This operative mortality can probably be reduced in two ways: (1) Selection of one of the other types of combined abdomino-perineal operation instead of the Coffey procedure; (2) The use of spinal anesthesia instead of general anesthesia. W. E. Miles had reported a mortality of 36.2 per cent under general anesthesia, which was reduced to 9.4 per cent under spinal. Cases should be carefully selected for this extensive operative procedure and only good surgical risk patients accepted; the others should have some other lesser procedure.

Dr. Peyton then demonstrated several patients from the Tumor Clinic.

*Case 1.*—Miss M. M., aged 62, had a lesion which began at the medial corner of her left eye in 1919. It was at first treated with salves, and later in the same year some X-ray therapy was given. The lesion improved but did not entirely heal. It remained rather quiescent until October, 1928, when it took on rapid growth. She came to the University Hospital for treatment in April, 1930. (The condition at the time of her admission to the clinic was demonstrated by lantern slides.) X-ray at the time of admission showed some involvement of the left maxillary sinus and the floor of the left orbit and left frontal sinus. She was treated with deep X-ray therapy during 1930 on April 30, May 5, May 23, July 18, October 11, and December 29. She was given narcotics for pain but the pain has been subsiding and at present she is not taking as much.

*Case 2.*—Mrs. B. A lump appeared in the left breast April, 1930, and was excised locally one month later. It almost immediately recurred and she had a radical mastectomy in December, 1930. A few weeks later an enlarged left supraclavicular node appeared and she was referred to the University Hospital; 792 mc. hrs. of radium implants were inserted into this and it has disappeared.

*Case 3.*—Mr. L., aged 65, noticed in April, 1929, a roughening of the left cheek on the mucosal surface. In January, 1930, a small lump developed at the site of this roughening. In April he consulted a physician and it was excised. In July, 1930, he had radium elsewhere. In November, 1930, he was first admitted to the University Hospital with a local recurrence at the site of removal of the primary lesion. This recurrence was about $3 \times 4$ cm. in diameter and was attached to the mandible with fixation of the jaw so that he could not open his mouth. The skin in this region was ulcerated, as was also the mucous membrane. There were no palpable nodes. X-ray showed involvement of the mandible. Biopsy showed squamous cell carcinoma, grade 4. On November 29, 1930, excision of the mandible was done and this was followed by deep X-ray therapy. He has had no recurrence since this removal.

*Case 4.*—Mr. O., age 48, first noticed a slight soreness of the right cheek in 1921 while chewing tobacco. The surface was rough. In the summer of 1925 it began to grow larger, at which time it was cauterized by a doctor. Following this it persisted and grew, and became painful. He came to the University Hospital for treatment in October, 1926. Examination showed an irregular, rough, ulcerated lesion, $2 \times 1$ cm., inside the right cheek. There were palpable submaxillary nodes in the right side. Biopsy showed squamous cell carcinoma. Two thousand mc. hrs. of radium was implanted in the lesion in November, 1926. In January, 1927, he had excision of the glands in his neck. Biopsy of these glands showed no malignancy. In November, 1927, the local recurrence was treated with 3 mc. of radium. In June, 1929, leukoplakia was destroyed with the surgical endotherm. In October, 1929, he had a local recurrence which was excised with the surgical endotherm and the mandible was cauterized, as it seemed to be involved. In February, 1930, he developed erysipelas. In May, 1930, the entire right side of the mandible sequestrated and was removed, leaving a large defect in the right cheek. In November, 1930, a recurrence was treated with 1,000 mc. hrs. of radium. On February 24, 1931, he was re-admitted to the hospital and a recurrent lesion was excised, the lateral wall of the antrum being removed at this time.

*Case 5.*—Mr. O. W., aged 62, noticed in December, 1929, a feeling of fullness in the rectum and diarrhea. He saw a doctor in October, 1930, and was referred to the University Hospital for treatment. Examination at that time was as follows: mentally confused, marked pallor of the skin; blood examination showed hemoglobin 75 per cent and 3,480,000 red blood cells. An operable carcinoma of the rectum was found about 10 cm. from the anal opening; it was movable and about 5 cm. in diameter, limited to the anterior wall of the rectum. Biopsy showed adenocarcinoma, grade 3. It was decided not to attempt radical excision because the patient's general condition was so poor. A colostomy was performed. Three thousand five hundred mc. hrs. of radium in the form of implants and high voltage X-ray therapy was given. On January 23 there was no definite evidence of recurrence but some induration and he was given 1,000 mc. hrs. of radium in the form of implants. There is no definite evidence of carcinoma at the present time.

*Case 6.*—Mrs. A. D., aged 69, first noticed this lesion in 1918. She had no treatment for two years, then had plasters in 1920. This was followed by radium therapy. She came to this hospital in September, 1928, at which time there was a large flat ulcer of the right frontal region with involvement of the upper eyelid. The lids had been sutured. Biopsy showed basal cell carcinoma. She had been given deep X-ray therapy in December, 1928, but this did not heal the lesion probably because the cartilage was involved. In January, 1929, she had more treatment but the lesion still did not heal and in February she was advised to come to the hospital for endotherm excision. In March, 1929, she had more X-ray therapy. She then disappeared until October, 1929, in the meantime going to a "healer." In October, 1929, she was re-admitted to the hospital and a recurrence was then removed with the endotherm knife. In December, 1929, there was a persistence of the carcinoma which was removed with the surgical endotherm. She had no further recurrence until April, 1930, when areas were removed which were found to be mixed squamous and basal cell cercinoma. In May, 1930, further recurrence was removed with the surgical endotherm. In March, 1931, a biopsy was taken which again showed a recurrence. This was treated with 1,500 mc. hrs. of radium implants. The patient is now in an almost hopeless condition.

*Case 7.*—Male, aged 58, had irritation and soreness of the tongue in July, 1929. In October, 1929, he saw a doctor and was referred here for treatment. Examination at that time showed a red, ulcerated lesion in the posterior part of the left side of the tongue, 3 cm. in diameter. There was an enlarged gland in the upper part of the left side of the neck. In November, 1929, the patient received 800 mc. hrs. of radium implants to the lesion. This was followed by deep X-ray therapy. In February, 1930, a block dissection of the left side of the neck was done. Squamous cell carcinoma was found in the glands of the neck. The patient had a local recurrence in February, 1930, which was treated with 950 mc. hrs. of radium implants. There was local recurrence in August, 1930, which was treated with 800 mc. hrs. of radium implants. He had another local recurrence in January, 1931, which was treated with 2,000 mc. hrs. of radium implants.

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Dr. Wilhelm K. Stenstrom (University Hospital) discussed malignancies especially amenable to X-ray and radium treatment. Dr. Stenstrom presented two cases as follows:

*Case 1.*—This man came in April, 1928, with a lesion on his hand. It was diagnosed squamous cell epithelioma in the Dermatology Clinic, and he was referred to the X-ray Therapy Department for treatment. A very heavy dose of X-rays was given and a second similar treatment was given two months later. If surgery had been used in this case it is doubtful if he would have had the full use of his hand.

*Case 2.*—This man came in June, 1930, with a lesion on the nose extending down on both sides. The ulceration was raised about 0.5 cm. and measured 3 cm. in diameter. It was diagnosed squamous cell epithelioma. The lesion was treated with gold radon implants into the raised edges and X-rays to the whole lesion. It has been healed since August, 1930.

Dr. Stenstrom said he wanted to call attention to another type of cancer best taken care of with radiation alone and that is cancer of the cervix. In this group radiation alone usually accomplishes more than surgery alone, but it is necessary to consider the various types. There are certain types that may be handled better by surgery and that is where the pathologist comes in to help the surgeon. Most groups of malignancies should be differentiated as to the grade of malignancy. As a rule the more malignant and fast-growing tumors do better with radiation; the slow-growing type are best taken care of with surgery.

DISCUSSION

Dr. Ivar Sivertsen asked how soon after radiation is surgery advised.

Dr. Stenstrom said that surgery usually was used first when combining the two, and if surgery is used after radiation one should give the radiation an opportunity to work—perhaps 10 to 14 days. He added that at the University Hospital surgery is not used in cancer of the cervix.

Dr. J. F. Corbett asked if any form of radiation was used in cancer of the breast.

Dr. Stenstrom replied that in certain cases radium is implanted after operation and X-ray therapy is used as a prophylactic postoperative treatment for all patients operated for cancer of the breast at the University Hospital.

Dr. Corbett asked if it was used before operation in these cases at the University Hospital.

Dr. Stenstrom replied that it was not.

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Dr. Wallace H. Cole (St. Paul) demonstrated the "Use of Skeletal Traction in Conditions Other than Fractures."

In order to show how skeletal traction either by the use of Steinman pins or Kirchner's wire can be used in conditions other than fractures, numerous lantern slides were shown which demonstrated the value of this procedure in the following conditions:

1. Congenital dislocation of the hip in older children, as a preliminary to open reduction or to shelving.
2. Pathological dislocation of the hip, in order to overcome the shortening before stabilization or reduction.
3. Coxa vara, after osteotomy.
4. Shortening of leg due to infantile paralysis.
5. Congenital shortening of the leg.
6. Marked angular deformities of the lower extremities, either acquired or congenital.

The results in all these conditions, in selected cases, are apparently far better than could be obtained by less radical means. The pins and wire do not cause any irritation or discomfort if applied and taken care of properly. Although special apparatus is needed for the leg lengthenings, all the other procedures can be ac-

complished with the use of only the simple Thomas splint.

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Dr. Edward T. Evans (Minneapolis) reported the following cases:

*Case 1.*—Arthroplasty of the Hip. The patient was a male, 44 years of age. Preservation of the integrity of the great trochanter during the operative procedure and disproportion between head and acetabulum were stressed.

*Case 2.*—A young man 21 years of age who, at the age of 11, developed a tumor of the knee which proved to be myxofibrosarcoma. Mid-thigh amputation was performed. (Specimen shown.)

Dr. Evans mentioned a case which he had operated on only that morning removing a large cystic hydroma of the knee joint. (Specimen shown.)

DISCUSSION

Dr. Wangensteen stated that these knee joint tumors are very interesting and that one other such case had come under his observation. The other case had been seen at the University Hospital several years ago and was thought at that time to be a hemangioma. Later the case had come under Dr. Colvin's care at the Ancker Hospital in St. Paul. Dr. Noble worked the tumor up from a pathological standpoint and found it to be a lipofibrosarcoma. They do not metastasize but are potentially malignant in that they tend to recur locally after removal. The only satisfactory treatment, therefore, is amputation.

Dr. Wangensteen felt that the injection of air after withdrawal of fluid from the pouch, in Dr. Evans' second case, was a unique manner of establishing the presence of continuity with the knee joint and was a significant principle in radiography of cysts and bursæ that has a wide range of usefulness and a method that had occasionally been used at the University Hospital in the recognition of such conditions over a five-year period.

Dr. A. R. Colvin (St. Paul) said he might discuss the second case from the point of view of difficulty in diagnosis. He had had a man at Ancker Hospital, 60 years of age, who had a tumor about three times the size of this one, and an interesting point about that was that he had been here some years before with an injury. The condition was diagnosed as a hematoma. He left the hospital and wandered around and came to St. Paul six years later. Dr. Colvin said they had at Ancker Hospital at the same time a man with a large swelling on the axilla and around the shoulder, with a diagnosis of carcinoma.

Their first case turned out to be a myxosarcoma and had an amputation done. Their second case was a large hematoma. In the first case the biopsy had been taken from a hemorrhagic area of the tumor, hence the confusion; and in their second case the biopsy was taken from an organizing area of the hematoma, hence the histological confusion. Amputation through the thigh was done in their first case and there is still no evidence of metastases in spite of the fact that it had existed such a long time; evidently it was not a very malignant tumor.

Dr. Wangensteen called attention to the fact that these knee joint tumors had been studied by Professor Wegelin, Director of the Pathological Institute in Berne, and that he found some of them to exhibit xanthomatous tissue.

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Dr. N. Logan Leven (University Hospital) discussed the "Uses of the Implantation Method of Skin Grafting."

Dr. Leven demonstrated a method of skin grafting first described in 1920 by Welhelm Braun in Berlin and introduced into this country by Dr. Wangensteen in the fall of 1928 (reported by Dr. Wangensteen in the March, 1930, issue of Surgery, Gynecology and Obstetrics).

The method consists in the implantation of small pieces of skin, $2 \times 4$ mm. in size, directly into the granulations. The skin is usually obtained from the anterior aspect of the thigh. After the usual skin sterilization by iodin followed by a half-strength solution of sodium thiosulphate in 70 per cent alcohol, the area from which the skin is to be removed is anesthetized by infiltration with 1 per cent novocaine solution. The surface to be implanted is painted with a 2 per cent aqueous solution of mercurochrome. No anesthesia of the granulating surface is usually necessary. (Light ethylene anesthesia may be used if there is much pain.) Drawing the skin taut between two dinner plate knives or tongue blades, a Thiersch graft is cut with a straight edge razor or with a razor blade held in a hemostat. The size of the graft removed will of course depend upon the extent of the area to be implanted. With a fine sharp scissors the graft is cut into small pieces, about $2 \times 4$ mm. in size; these are placed on a sterile board covered by a towel. With a Kelly forceps an ordinary small straight round sewing needle is grasped "end on" so that the blunt end of the needle is free. The small implants which have been cut are then impaled with the blunt end of the needle and pushed obliquely into the granulation tissue until they disappear from sight. The needle is withdrawn, using a tissue forceps or another needle to retain the graft in place.

The grafts are implanted about 1 cm. apart, covering the entire granulation surface in this manner. By this method a large defect can be covered with a small amount of skin.

For a postoperative dressing vaseline gauze may be used; however, if the wound is infected and discharging pus, the ordinary Dakin's dressing is used, there being no danger of washing off the implants. About one week later small whitish areas appear at the sites of implantation. These small islands of epithelium grow rapidly and cover over the granulating surface.

The question arises why epithelial cysts are never found in this type of graft, since in the case of traumatic or experimental implantation of epidermis in the normal skin the well-known Reverdin's traumatic epidermic cysts develop. These implants are laid in a soft mass of granulation tissue and grow without injury or

resistance along small clefts to the surface of the granulations. In the normal skin, on the other hand, the epidermis is interposed between the rigid fibers of the reticular part of the skin and tend to grow along the relatively large lymph spaces rather than in any other direction.

*Case 1.*—This patient had a disarticulation at the hip on February 11, 1931, for an extensive tuberculous infection of the head and neck of the femur and of the ilium with sinus formation. A rather long medial flap was used to partially close the defect. On the fourth day, however, a large part of this had to be sacrificed on account of a gas gangrene infection. On March 4, after granulations had formed, the stump was implanted by this method and, despite constant purulent drainage from the ilium, it is healing nicely.

*Case 2.*—This patient had a large defect following removal of the right scapula for a large mixed-cell sarcoma. This was implanted and healed nicely.

*Case 3.*—This patient on admission to the hospital last fall presented a large ulcer on the lateral aspect of the left foot following X-ray therapy. On four occasions this was widely excised by cautery and by sharp dissection in an effort to obtain a granulating base. Granulations at all times appeared indolent, unhealthy, and covered by a pellicle of fibrin. These granulations were implanted, using thicker implants than usual.

Braun has suggested, in using this method in sites where there will be traction or pressure, that the graft should be cut to one-half or two-thirds the skin thickness.

Dr. Leven showed a lantern slide exhibiting a large pressure sore in which the method had been employed. The patient was suffering from a paraplegia secondary to metastasis to the dorsal spine from a carcinoma of the cervix uteri, and developed a large decubitus ulcer over the sacrum. This was implanted and, despite pressure and incontinence of urine and feces, was practically healed at the time of her death seven weeks later.

Dr. Leven stated that the only condition requisite in using this procedure is that granulation tissue must be present in the wound. The method is effective in the presence of infection and does not require healthy granulation for growth. He stated that this type of graft has an absolute indication in those cases in which other types of graft would fail—in osteomyelitic cavities, chronic empyema cavities, and decubitus ulcers with undermining of the skin. The epithelial surface resulting from this type of graft is similar to that of wounds in which all the epithelium has been derived from the periphery of the wound, the implants not preserving their identity.

Since the fall of 1928 this method of skin grafting has been used in about 100 cases of all types—decubitus and trophic ulcers, varicose ulcers, osteomyelitic and chronic empyema cavities, amputation stumps, operative and traumatic defects, and burns. In 80 per cent of these cases the results have been very satisfactory. A further factor that commends the use of this method is that it may be used in ambulatory patients in the outpatient department.

DISCUSSION

Dr. Wangensteen stated that this technic of skin grafting was employed quite frequently at the University Hospital and that undoubtedly some cases had been grafted by this method in which others methods would have served the purpose just as well or better. In obtaining an epithelial covering over excavated defects such as osteomyelitic cavities, pressure sores, or deep empyema wounds, the method has no equal.

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Dr. C. Donald Creevy (University Hospital) discussed "The Punch Operation for Prostatic Obstruction."

He reviewed briefly the history of attempts to relieve prostatic obstruction by transurethral operations, beginning with the catheter knife of Guthrie in 1834, and then later the instruments of Mercier and Bottini. He pointed out that these early attempts failed because surgeons failed to appreciate the necessity for preliminary drainage of the bladder, and because the obstructing gland could not be inspected directly. Young's punch, brought out in 1911, obviated the second difficulty, while experience had eliminated the first. He prefers the Braasch instrument because of the ample size and direct illumination which permit adequate visualization of the urethra and the removal of large pieces of the gland; bleeding is controlled by electrocoagulation of the individual vessels under direct vision.

Dr. Creevy recognized four indications for the use of the prostatic punch, namely, the median fibrous bar at the vesical outlet, whether inflammatory, postoperative, or carcinomatous (palliative); postoperative infection of the surgical capsule; small lateral lobe hypertrophies, and in certain lesions of doubtful nature the instrument may be used to secure tissue for microscopic examination (recognition of early carcinoma).

He cited the low mortality of the punch operations in the hands of experts (Young, Caulk, Bumpus)—three-tenths of one per cent in over 1,000 cases, but regretted that studies of late results in large series of cases were not available.

He showed three cases illustrating different problems.

*Case 1.*—The patient had had a persistent suprapubic fistula and total urinary incontinence for 18 months after prostatectomy done elsewhere. Removal of a cicatricial postoperative bar by the punch together with postoperative dilatations of the urethra had resulted in complete return of continence.

*Case 2.*—This was the case of a man with an inflammatory bar who had been subjected to the operation 48 hours before. He was already up and about in comfort and was shown to illustrate the minor character of the postoperative reaction in many cases.

*Case 3.*—This man was admitted with auricular fibrillation and cardiac decompensation complicated by a small lateral lobe hyperthrophy of the prostate with 150 c.c. of foul residual urine. After the compensation had returned under the care of the Medical Service, the punch had been used and the residual urine relieved in a situation in which prostatectomy would have proved hazardous.

Dr. Creevy pointed out that Caulk and Bumpus were

using the punch in large lateral lobe obstructions with good immediate results, but could not predict whether these would be permanent.

DISCUSSION

DR. E. A. REGNIER asked what method is carried out in drainage of the bladder following the punch operation.

DR. CREEVY said that he had been in the habit of electro-coagulating each bleeding point and omitting the indwelling catheter. If there is any evidence of post-operative urinary retention it is relieved by catheterization.

DR. THEODORE SWEETSER asked about cases reported in England of obstruction after prostatectomy and if Dr. Creevy would consider that this was a good procedure in relieving that scar tissue.

DR. CREEVY stated that he had carried this out in four cases with very satisfactory results, but that his experience extended over only one year and he could not say anything about the late results.

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DR. H. A. CARLSON (University Hospital) presented two cases of malignant melanoma with regional metastasis in which operation had been performed.

*Case 1.*—This patient was a male 63 years old. In July, 1929, he first noticed that he had a pigmented mole on the back of his neck. In January, 1930, he observed that he had small masses on the right side of his neck. The glands continued to enlarge and in May his physician removed a specimen for microscopic examination. This was sent to Dr. E. T. Bell, who returned a diagnosis of malignant melanoma. Excision of the primary melanoma and block dissection of the neck was performed by Dr. Wangensteen on May 14, 1930. Subsequently he had deep roentgen therapy. He was followed in the dispensary and in November a nodule was removed from the right deltoid region which was found to be a recurrence. Since that time no evidence of recurrence has been found. He has gained 25 pounds in weight since the operation.

*Case 2.*—This patient was a male, 58 years of age. He had had a small subcutaneous nodule on the tip of the left ear for many years. It was injured in June, 1928, by a wood splinter and the resulting ulcer failed to heal. In July, 1929, he went to the Minneapolis General Hospital because of pain. On biopsy, the diagnosis was malignant melanoma. He was operated on by Dr. W. T. Peyton at the University Hospital August 5, 1929. The primary lesion was excised and a block dissection of the neck performed on the left side where enlarged nodes were present. X-ray therapy was instituted. There has been no evidence of recurrence.

DISCUSSION

DR. WANGENSTEEN stated that the early excision of the regional lymph nodes in malignant melanoma demands emphasis. So frequently one sees instances in which the local lesion had been excised and nothing done to the local nodes. Just as the excision of the regional lymph nodes is an important principle in the treatment of carcinoma, Dr. Wangensteen felt that the early removal of the regional lymphatics together with the local lesion would bring about better results. He admitted that melanoma may not always spread by the lymphatics, but felt that it occurred with such regularity that the excision of the lymph nodes should be the accepted mode of dealing with malignant melanoma of the skin. He stated that their experience at the University Hospital indicated that these tumors are not radio-sensitive. In the summer of 1928, Dr. Wangensteen said that Mr. Sampson Handley of the Middlesex Hospital in London had shown three instances at the International Cancer Conference in which this "complete" operation had been done. Handley removed the intervening lymphatic vessels in the fascia as well. All of these patients were quite well and one had survived for about 18 years.

DR. A. T. MANN recalled a very interesting case that would bear out the lack of malignancy in some of these melanomata. A girl about 13 years old came in with a melanoma on the back which was like a very large boil in shape and had considerable mass to it. It was not one of these moles, although it may have been to start with. It was fairly widely excised but in excising it one could see black spots way back in the muscles of the back. It was decided that this was too widely distributed for excision of the secondaries and she was closed up with those black spots still there. She walked into the office two years later, apparently in perfect health. Her back was smooth and she showed no signs of recurrence.

DR. WANGENSTEEN said that a previous experience that had terminated unfavorably had taught him that the closure of the skin wound was an important item in protecting the patient with a deep wound from infection and, in the case demonstrated by Dr. Carlson, he had performed an atypical Z-plasty at the initial operation to help cover the defect.

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DR. HORACE G. SCOTT (University Hospital) discussed "The Nutrition Problem in Fistula of the Small Intestine," and showed a boy, 13 years of age, with the following history:

In January, 1928, the boy had an operation for ruptured appendix. The appendix was removed and drainage instituted. He drained for 10 days. Six months later he developed an incisional hernia and was re-operated, at which time adhesions were found. He was fairly well until November, 1930, when he developed intermittent crampy, colicky pains in the abdomen followed by nausea and vomiting. His symptoms persisted for four days before he entered the University Hospital. On admission he was found to be very ill; his pulse was 164 and he was quite dehydrated. There was considerable distention and diffuse tenderness, muscle spasm and rigidity present over the entire abdomen. Flat plates of the abdomen revealed gas in the small intestine. A preoperative diagnosis of intestinal obstruction was made, probably of the strangulating type. At operation a reddish, black mass was found which proved to be a two-foot loop of lower ileum. A Mikulicz exteriorization of the bowel was

done and the strangulated segment resected. Catheters were placed in both segments of the bowel and the content from the proximal loop was run into the distal loop under the influence of gravity. After a few days, however, the catheters became loose and the introduction of the proximal loop content into the distal loop was found to be impractical. The boy lost approximately 1,500 c.c. of food and fluid a day from the proximal loop. As a result he steadily lost weight on a general diet, his weight falling from 87 to 49 pounds over a six-weeks' period. The last two weeks of this period he was placed on a special high carbohydrate diet. This diet apparently did not help to check his falling weight. In fact, it apparently aggravated peristalsis. Observation of the proximal loop revealed a forceful frequent discharge of yellow fluid and undigested food occurring within thirty minutes after eating. The diet was then changed. The carbohydrates were cut down and the emulsified fats were increased by giving the boy a glass of half milk and cream at frequent intervals. Within a couple of days after this change in diet had been effected, the discharge from the proximal loop was observed to be less forceful, and to contain less and less undigested food. After a week's time it was slowed up to such an extent that after eating a meal it was two or three hours before any fluids were discharged. The boy then began to regain his lost weight. Three weeks later he was re-operated upon and the continuity of the gut was re-established. He then went home. Ten days later he had another acute obstruction attack. The abdomen was again opened. This time a large loop of jejunum was strangulated. After release of the strangulating band of adhesions the color of the gut returned. The abdomen was then closed with enterostomy drainage of the proximal loop and the boy made an uneventful recovery.

Dr. Scott stated that this case illustrates one important fact which is overlooked in the feeding of the fistula case, namely, that carbohydrates, although easily assimilated, enhance the peristaltic activity of the bowel; whereas emulsified fats cause a slowing of peristalsis which allows more time for the absorption of food and fluids lying within the gut.

DISCUSSION

Dr. E. A. Regnier asked if it had been possible at the second operation to determine where the site of the original enterostomy had been.

Dr. Wangensteen said it was about two feet from the cecum and that, whereas in adults no difficulty is to be anticipated from such a fistula, children notoriously stand small intestinal fistula of a complete nature very poorly. He said in the literature instances of decline in health and loss of weight are to be found reported after intestinal resections and anastomoses that an adult would well tolerate.

One other point relative to the case presented by Dr. Scott, he felt should be emphasized, viz., the value of high protein feeding in such instances. There was a good urinary output on an oral intake of fluid, but the tissues would not retain water until there was a liberal assimilation of protein. Then the normal turgor returned to the skin.

Dr. Wangensteen explained that Dr. McQuarrie, Chief of the Pediatrics Department in the Hospital, had rightfully called attention to the necessity for high protein feeding in this boy, and the boy's subsequent gain in weight was undoubtedly due in large measure, he felt, to this suggestion of Dr. McQuarrie.

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Dr. Ralph Knight (Minneapolis) discussed "Selection of Anesthetics."

Spinal anesthesia, he stated, has taken a very important place in all operations below the diaphragm, and its advantages are so great that the tendency is to increase its use for all such operations which are not so minor as to be done with very brief gas anesthesias or very simple block infiltration. It affords a degree of relaxation not obtained by inhalation anesthesia.

Probable contraindications are: marked hypertension and hypotension, especially with debility from wasting or toxic illness, shock or hemorrhage. These are, however, contraindications for other anesthetics except possibly local or block anesthesia and probably the use of spinal anesthesia with very careful and improved technic will be gradually extended to the poorer risks.

Spinocaine had been used almost exclusively because it was thought best to use one method until a fair-sized series had been run, according to Dr. Knight. There had been a few failures and some had not lasted long enough for the operation. His personal impression is that spinocaine anesthesias tend to last longer than simple novocaine spinals, but that spinocaine exhibits a few more failures of sufficient anesthesia than does novocaine. Theoretically, at least, there is a little less margin of safety with spinocaine because of the technic of raising the head of the table until the desired level of anesthesia has been reached. Practically, this is probably neutralized by meticulous care in watching the blood pressure and lowering the head well in case of a drop below 70 per cent of the orginal, or in any case below 90 mm. Preliminary ephedrine is still given, and epinephrin in case the blood pressure falls, because it was felt that the patients are made more comfortable and get along better. Spinal anesthesia has not been used for work above the diaphragm, Dr. Knight stated. When spinal anesthesia must be reinforced by inhalation, ethylene is the agent of choice as it is usually sufficient without ether.

Ether is still the anesthetic of choice for a large number of operations about the head, especially in children, and will probably remain so unless alkoform or some other agent proves of greater value. Chloroform is often the agent of choice when deep anesthesia is needed for the use of the cautery about the head.

Local anesthesia has a wide field and is used liberally above the diaphragm, frequently being supplemented with a gas, especially for neck and chest work, the choice for the supplementing gas being ethylene.

Special anesthetic methods such as rectal and intravenous administration have not been found serviceable enough to be used to any great extent. They have a distinct field for operations which make local, spinal,

and inhalation anesthesias impractical to administer. Ether by rectum is felt to be the most satisfactory in this field. It has a special indication for brain surgery as inhalation anesthesia has been found to increase the intracranial pressure. Rectal anesthesia has one great disadvantage in that recovery is sometimes very prolonged and the patient must be closely watched all this time to prevent pharyngeal occlusion.

The following figures show the anesthetics which have been selected for various regions and operative procedures during the past year (March 1, 1930, to February 28, 1931) at the University Hospital:

3,703 anesthetics exclusive of obstetrics, but including all other general and special surgical services.
14 different anesthetic drugs.
50 different combinations.
120 H. M. C., 17 per cent reinforced.
23 avertin, colonic, 60 per cent reinforced—all head, neck and bronchoscopies.
44 ether, colonic, 57 per cent reinforced—all head, neck, upper extremities and spine.
482 cocaine, including 20 eye, 47 nose and throat, 50 bronchoscopies, 365 cystoscopies.
992 novocaine infiltration, 22 per cent reinforced.
22 novocaine, spinal, 22 per cent reinforced.
10 novocaine, sacral, including 8 prostatectomies.
778 spinocaine, spinal, 15 per cent reinforced.
450 nitrous oxide basic, 38 per cent reinforced.
361 ethylene basic, 27 per cent reinforced.
339 ether inhalation.
20 chloroform, all about head, except 2 bronchoscopies.
15 ethyl chloride, including 5 cystoscopies.

By Regions:

126 upper abdomen: 61 per cent spinocaine alone; 34 per cent spinocaine plus inhalation; 5 per cent inhalation alone.
381 lower abdomen: 56 per cent spinal alone; 12 per cent spinal plus inhalation; 2 per cent novocaine infiltration; 29 per cent inhalation alone.
511 cystoscopies: 12 per cent H. M. C.; 71 per cent cocaine; 7 per cent spinal; 9 per cent inhalation.
142 prostatectomies and cystotomies: 71 per cent H. M. C.; 4 per cent spinocaine; 2 per cent spinocaine plus inhalation; 5 per cent novocaine, sacral; 14 per cent novocaine infiltration; 18 per cent inhalation.
967 below diaphragm—outside of abdomen and bladder: 30 per cent spinocaine; 2 per cent spinocaine plus inhalation; 1.4 per cent novocaine, spinal; 5.6 per cent novocaine infiltration; 60 per cent inhalation.

Regions above the diaphragm have not been tabulated for this report because the wide variety of operations done and the wide variety of anesthetic combinations used would make it too voluminous.

There were six deaths during the year in which the anesthetic should be evaluated as to whether it was a cause or contributing cause. All were extremely poor risks.

*Case 1.*—A very toxic man, aged 68, died under spinocaine anesthesia during operation for a large subdiaphragmatic abscess from a perforated duodenal ulcer of more than a week's standing.

*Case 2.*—A frail woman, aged 42, died under novocaine and ethylene anesthesia for thoracoplasty for pulmonary tuberculosis. She had acromegaly, was a very poor risk and died as the incision was made.

*Case 3.*—A frail woman, aged 46, died suddenly after 95 minutes of satisfactory ethylene anesthesia for operation for rheumatic contractures of the knees. Autopsy showed brain tumor with conus herniation of cerebellum into foramen magnum.

*Case 4.*—A man, aged 55, who had a very extensive carcinoma of the tongue died after only a few minutes of ethylene for ligation of the external carotid artery.

*Case 5.*—A man, aged 67, who had previously had extensive resection of the tongue, lip and mandible for carcinoma died after 10 minutes of chloroform anesthesia just as cauterization of a recurrence started.

*Case 6.*—A man, aged 72, had his maxilla resected under colonic ether and died 8 hours later before he had entirely recovered from the anesthesia. It was believed that his pharynx might have become occluded during a brief time when the attendant was away.

Dr. Knight stated that in each of these instances there were contributing factors and not in a single instance could one say arbitrarily that the anesthesia alone was responsible.

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Dr. Melville H. Manson (University Hospital) discussed "Gas Bacillus Infection" with special reference to its occurrence postoperatively in cases of preëxisting gangrene and chronic ulcers.

There had been 9 cases of gas gangrene at the University Hospitals during the past two years. Five of these followed operative procedures and two in particular led to further investigations of the infection. These two cases developed in amputation stumps. The operations were performed for chronic, painful ulcers, which had resisted all conservative treatment. Two of the other cases were in patients who had preëxisting gangrene. The only deaths in the nine cases were the two which developed following amputations for chronic ulcers.

Dr. Manson said that the literature contained only a few references to the development of gas gangrene in conditions of this sort. He had cultured a series of chronic ulcers and found pathogenic, gas-producing anaërobes in approximately 30 per cent.

He stated that the use of polyanaërobic or specific anaërobic antitoxins had not been accepted unreservedly by the profession. Evidence was presented which showed the efficacy of the antitoxins. During the World War Saquepee gave polyanaërobic antitoxin to 319 wounded men with a resulting incidence of gas gangrene of 1.17 per cent. In a control series the incidence was 7.2 per cent. In a series of 191 developed cases, the mortality in those treated with antitoxin was 13.9 per cent, while in the same region the mortality of the untreated cases was 75 per cent. Ivens gave a polyanaërobic antitoxin to 433 cases in which there were

30 cases of gas gangrene when first seen. In this series there was one death. Henry and Lacey injected 50 guinea pigs with cultures obtained from cases of gas gangrene. Of this number 44 were pathogenic. To the 44 guinea pigs they gave antitoxins of Bacillus welchi and Vilrion septique, which protected 33 of the animals. To the 11 non-protected animals they gave antitoxins of Bacillus edematiens which protected six. From the five unprotected pigs, cultures of Bacillus fallax were obtained in two, and three had unidentified organisms.

Dr. Manson said that the principles of surgical treatment were well established but emphasized the point that no tourniquet should be used when amputation is done. A case was related in which the shutting-off of the circulation for only a few minutes was responsible for the development of a case of gas gangrene developing in a preëxisting gangrene.

He believed that chronic ulcers should be included with preëxisting gangrene as possible source of gas bacillus infections following operative procedures.

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Dr. W. A. O'Brien (University Hospital) told of the development of the Pathological Department of the University Hospitals. While an integral part of the Department of Pathology of the Medical School, it functions as a separate unit.

There were 645 tissues examined in 1925. In 1930, the number had grown to 2,331. Approximately 225 examinations are being made monthly during the present year. During the same time postmortem examinations increased from 83 to 218. Approximately 24 examinations per month are being done this year. Part of this increase in autopsies is due to the increased bed capacity and part to an increased percentage of permissions (53.2–78.4 per cent). The University Hospitals are among the first 10 in this country in percentage of autopsies. The Mayo Clinic, the Minneapolis General Hospital and the University Hospitals have the highest state percentage of any group in this country or Canada. Much of the percentage increase is due to the splendid coöperation received from the hospital services.

All tissues removed at operation are routinely examined (except tonsils and adenoids, which are done on request). Surgical pathology has undergone a distinct change due to the increased number of biopsies and the development of a uniform terminology for clinical pathological correlation. The diagnosis of chronic appendicitis is not made. Appendices are grouped as follows: (1) No active inflammation (interval operation or removal at another operation); (2) Peritonitis (arising from within or without); (3) Acute suppurative appendicitis; (4) Obliterated appendix. By using this method excellent diagnostic and prognostic correlations are obtained.

Routine curettage and cervical biopsy are done on all bleeding women and those who have a cervical lesion. A distinct type of endometrium showing hyperplasia and cysts (Swiss cheese) is frequently found near the menopause. It is apparently due to ovarian changes (granulosal cell) and responds to radiation.

Thyroid glands are grouped under a few headings: (1) hyperplasia; (2) adenomatous; (3) colloid; (4) thyroiditis, and (5) malignant. No attempt is made to predict the type of disease in the patients. Patients with glands showing inflammatory changes are routinely followed for signs of hypothyroidism.

Dr. O'Brien said that tumor grading (typing) is here to stay. It has always been done by most pathologists. Giving numbers to various types is helpful in comparing the work of various investigators and attempting prognosis—tumors that are less malignant (types 1-2) and more malignant (types 3-4). Type 1 is usually borderline malignancy. Type 2 is fairly definite. Types 3-4 vary because some men classify by the degree of differentiation and others by the most malignant part; taken together they constitute a rather uniform group in the various reports in the literature.

Brain tumors are classified by the Cushing-Bailey method; some are easy to group (spongeoblastoma, medulloblastoma, and astrocytoma) while others are more difficult.

Certain types of specimens require a different number of sections. Apparently all appendices should have three sections—base, middle and tip. Large ulcers of the stomach and suspicious prostate glands require an unusually large number. In one of their cases at the hospital more than 40 sections were made of a large gastric ulcer before malignancy was found.

Breasts showing diffuse induration (after 25) present a diagnostic problem. Surgeons do not hesitate to remove a single definite lump for opinion, but are apparently content with a diagnosis of diffuse cystic disease when diffuse lumps are present. This method has been abandoned at the University Hospitals and all definite diffuse lumps are removed for opinion. Diffuse cystic disease may mask carcinoma. Recurrent tumors of all types are removed for diagnosis and prognosis. Some of them are of low grade malignancy and secondary operations may be done with benefit to the patients. Centrifuged fluid and needle biopsies are on the increase. Ten years ago one-third of all biopsies were benign and two-thirds malignant; today conditions are completely reversed. Special pathological services have been developed in the Division of Dermatology under the direction of Dr. Henry E. Michelson; in the Division of Neurology under the direction of Dr. J. C. McKinley; in the Division of Ophthalmology under the direction of Dr. Walter E. Camp.

There are three full-time Fellows on the Pathology Service at the present time: Drs. O. S. Randall, B. J. Pearson, and E. C. Hendrickson. Under supervision they examine and report all surgical specimens and do the autopsies. In addition they assist in preparing material (case reports and literature abstracts) for the weekly general staff meeting, and show the surgical specimens and microscopic slides at the weekly surgical pathological conference. All are planning surgical careers.

Dr. O'Brien stated that the Department of Pathology of the University Hospitals is showing a healthy growth. The diagnosis of biopsies constitutes more than one-half of the work. Experience in surgical pathology and postmortem examinations should be part

of the training of every surgeon. Opportunities are provided for three full-time Fellows at the University Hospitals at the present time.

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Dr. O. H. Wangensteen (University Hospital) presented a group of thoracic cases. The first group illustrated interesting features of empyema.

*Case 1.*—The first patient was a girl of three, who had recently had pneumonia. Later fever recurred and pus was aspirated from the right chest. The X-ray films showed a density over the middle portion of the right lung with a clear costophrenic angle. The impression from the films was that an interlobar empyema in the main fissure was present. A needle was inserted in the fifth intercostal space and 35 c.c. of a thick pus was obtained in which the pneumococcus was demonstrated. Two subsequent tappings were negative and, because of continued fever of 101° to 103° F., the fifth rib was resected. A large amount of pus and a large fibrin plug about the size of a man's hand was obtained. A drainage tube was inserted and the fever promptly came down. A subsequent X-ray plate showed no pneumothorax corroborating the impression of an encapsulated empyema. Irrigation of the small cavity with Dakin's solution together with blowing on bottles, Dr. Wangensteen felt, should quickly expand the lung and obliterate the cavity. The fibrin plug had prevented successful aspiration, in his opinion. Whereas aspiration, as recommended by Brenneman, is a commendable feature of empyema treatment in infants, Dr. Wangensteen felt that drainage in older children was the wiser plan.

*Case 2.*—Dr. Wangensteen referred to another case with an interlobar empyema and demonstrated X-ray films. The patient was a boy of 8, who had become ill with pneumonia in December, 1929. After convalescence, the fever recurred, and in May, 1930, operation was performed elsewhere for empyema of the left chest. A free pleural space and no pus was found at operation. Drainage was instituted but without effect. In August, 1930, the boy was admitted to the University Hospital with a steeple-chase type of temperature. There was no sputum. X-ray examination showed a fluid level with air above it. The costophrenic sinus was clear. The absence of sputum and the presence of air in the chest ruled out a lung abscess and a diagnosis of an encapsulated empyema was made. At the first operation, a free pleural space was again found and two ribs were removed and an iodoform gauze tampon was placed over the parietal pleura. Eight days later the wound was opened up and considerable pus was evacuated by incision after needling the thickened membrane overlying the encapsulation. There was prompt improvement and the boy returned to school.

*Case 3.*—The next patient was a boy of 24 years upon whom Dr. Wangensteen had performed decortication to obtain expansion of the lung for recurrent empyema. During the preceding nine years the patient had been operated upon six times for acute empyema. The patient had promptly gotten well following each operation but he had never stayed well because of an unobliterated empyema cavity. X-ray films, made after the injection of iodized oil, demonstrated that the sinus tract extended from the lower right lateral chest wall up toward the hilum of the lung. It was Dr. Wangensteen's first impression that the lung would be atelectatic after so many years and he believed that the chest wall would have to be brought to the lung by the Schede deribbing operation. At the initial procedure segments of five ribs were removed and a large dinner-plate sized area of parietal pleura more than an inch in thickness was removed. This procedure failed to obliterate the cavity completely and five weeks later the wound was opened again. In the interim the patient had blown on bottles in an effort to expand the lung but without any result. At the second operative procedure a membrane about 2 mm. in thickness, which at the initial operation was thought to be the visceral pleura, was incised. It was found that this membrane could be peeled off the lung much in the manner that one peels an orange. The lung expanded immediately and filled the wound; there was no bleeding and the restraining membrane was removed without breaking into lung substance. A Z-plasty was employed to cover the skin defect at the conclusion of the operation. Because of tension the skin closure gave way in part and when granulations later formed over the lung, skin implants were used to fill in the defect. The cavity has been completely obliterated and the patient has returned to work. Dr. Wangensteen stated that he had subsequently employed the decortication method (Delorme procedure) in other cases of empyema with complete satisfaction. He had been surprised at the minimal amount of bleeding and stated that the patients were pleased in being spared the greater deformity of the chest wall of the Schede operation.

The next group of cases shown by Dr. Wangensteen were of suppuration within the lung.

*Case 4.*—A women, 27 years of age, in January, 1931, developed a parametritis after an abortion. About three weeks ago she was brought to the University Hospital and admitted to the gynecological service because of a continued septic type of fever. Examination at that time showed a fixed uterus with dense adnexal masses. There was also slight tenderness and rigidity in the lower abdomen. Later the patient developed pain in the chest and X-ray examination showed an infiltration in the lower right lobe and an elevated diaphragm which was found to be immobile on fluoroscopy. An X-ray diagnosis of subphrenic and pulmonary abscess was made. Findings of a pneumonia were present in the lower right lobe. The patient had a persistently high fever and an extremely rapid pulse and appeared very ill. The question arose as to whether drainage for subphrenic abscess should be instituted. Physical examination failed to demonstrate any tenderness in the subhepatic or suprahepatic areas on the right side. Aspiration of the pleural space obtained no fluid as is often present when a subphrenic abscess exists. Aspiration of the subphrenic space failed to obtain pus. It was, therefore, felt that the mere presence of a high fixed diaphragm could not be considered conclusive for the presence of a subphrenic abscess. Postural drainage was instituted and the patient began expectorating

a foul purulent sputum. The temperature has gradually receded and the patient's condition has markedly improved. Dr. Wangensteen said there were two possible explanations for the development of the lung abscess; one is that it was metastatic in origin; the more likely explanation would appear to be that the bronchopneumonia resulted in a residual abscess. The actual mechanism of the origin of the lung abscess might perhaps never be apparent, but the absence of tenderness over the lower chest on the right together with failure to obtain fluid from the pleural cavity and pus beneath the diaphragm, Dr. Wangensteen felt, militated against its origin from a subphrenic abscess.

Dr. Wangensteen referred to the fact that subphrenic infections frequently make their way through the diaphragm, whereas intrapleural infections rarely if ever reach the peritoneal cavity by direct extension. Küttner has shown that the lymphatics of the subdiaphragmatic peritoneum perforate the diaphragm, affording an explanation for the frequent presence of a transudate in the pleural cavity, accompanying subdiaphragmatic suppuration. Dr. Wangensteen related that he had recently seen on the Gynecological service a patient who had developed a diffuse peritonitis from the sudden perforation of a residual pelvic abscess into the peritoneal cavity. Later empyema developed. At autopsy a perforation of the left diaphragm near the esophageal aperture disclosed its origin.

Dr. Wangensteen referred to a patient who had recently been operated upon for a perinephritic abscess at the University Hospital who had developed a lung abscess by extension through the diaphragm. It, too, cleared up spontaneously with postural drainage as in the instance of the lung abscess just demonstrated.

*Case 5.*—A woman of 28 years was then shown, who had been sent to a sanatorium for tuberculosis in the fall of 1929 because of cough, fever, night sweats, weakness, and sputum. These symptoms had begun three weeks after tonsillectomy under ether. At the sanatorium numerous sputum examinations failed to reveal tubercle bacilli and a diagnosis of lung abscess was made. Pneumothorax was instituted and the patient improved but the fever continued, though in lesser grade, and the density in the lung persisted. She was admitted to the University Hospital early in 1930. Three bronchoscopic aspirations were done and the patient was dismissed in May, 1930, as well. Later in the summer she returned to report that she had had a small hemorrhage. An X-ray film then demonstrated a small cavity in the previously consolidated area. This has since healed and she has remained quite well.

Dr. Wangensteen related that another patient had recently returned for observation whom he had treated because of a lung abscess in the upper right lobe in January of this year. On postural drainage it had entirely cleared up and the X-rays now show the rather large cavity initially present to be healed.

*Case 6.*—The history of a patient, aged 25, who was then in the University Hospital but too ill to be shown, was briefly reviewed. The patient had been successfully operated upon at another hospital for acute suppurative appendicitis with local peritonitis. During the convalescence a central type of lung abscess developed in the lower lobe on the right side. Pneumothorax was given and considerable sputum was evacuated with marked improvement. Two other refills were given and the patient though not yet ambulatory left the hospital apparently getting along very well. A few days later the boy became very ill again. He was admitted to the University Hospital a few days ago with a persistently high fever, rapid pulse and foul bloody sputum. He had been irrational since admission. X-ray examination revealed a cavity in the apex of the lower right lobe. There was still a little air in the pleural space with no evidence of an exudate. An attempt had been made to reëstablish the pneumothorax before admission to the hospital but the attempt had not been successful. Three weeks had intervened since the last refill. Examination of the sputum after washing showed fusiform bacilli and spirilla present in large numbers. A subsequent X-ray examination showed spreading cavitation in the entire right lung. A diagnosis of pulmonary gangrene was made, due probably to secondary invasion from organisms in the mouth. The patient had been given neoarsphenamine intravenously, but without apparent effect.* Kline and Berger, of Cleveland, Dr. Wangensteen stated, had been enthusiastic about the treatment of pulmonary gangrene with arsenicals. Most chest surgeons, however, he stated were conservative in their estimate of its value.

It should be stated that abscesses centrally located in the lung already in communication with a bronchus, as in this instance, are the only ones in which pneumothorax is indicated. When pneumothorax is employed in the compression of an abscess located in the periphery of the lung, the hazard of empyema is invited. Though Whittemore and Balboni, in 1928, found a large number of instances reported in the literature in which pneumothorax had been highly successful in dealing with lung abscess, they had only two successes in 18 cases. It need scarcely be mentioned that aspiration of a suspected lung abscess for diagnosis through a nonadherent pleura is a dangerous procedure.

*Case 7.*—The X-ray films were demonstrated in the case of a woman of 40 years, who in July, 1930, developed chills and fever, followed by cough and expectoration of foul sputum about ten days after tonsillectomy under ether. She had been admitted to the University Hospital in September, raising about 500 c.c. of sputum a day. The patient's appetite was poor and there had been considerable weight loss. The temperature ran as high as 102° F. daily. Postural drainage and repeated bronchoscopic aspiration were without effect. The abscess was represented by a diffuse consolidation of the upper two lobes of the right lung. Pneumothorax was ineffectual. In October, external drainage was done, the surgical endotherm needle being employed to give hemostasis. Two operative procedures were necessary to give adequate drainage in the carnified lung. The sputum quickly diminished to a small amount and the patient became afebrile. She has gained in weight and at the present time has no sputum. The process in the lung has been slow in resolution and has not

*Note: This patient has since died.

entirely cleared up. Whenever the patient "catches cold" she has 10 to 30 c.c. of sputum for a few days. As long as there is any trace of consolidation persisting in the lung on X-ray examination a small tube will be worn to keep the wound open. The bronchial fistulæ present will in all likelihood close spontaneously. In event they do not, a muscle flap may be employed to close them.

Dr. Wangensteen stated that in his experience fully 50 per cent of acute lung abscesses healed under conservative treatment of bed rest, postural drainage, bronchoscopic aspiration and compression by pneumothorax in selected cases; one chronic abscess of almost a year's duration in this series was completely healed following bronchoscopic aspiration. In those in which conservative measures fail, external drainage must be done.

Dr. Wangensteen said that satisfactory experimental evidence had finally been adduced to substantiate the opinion long held by clinicians that the majority of abscesses are due to aspiration of a foreign body or septic material into the lung. Tonsillectomy under ether is probably the most frequent single cause in the development of lung abscess. After loss of the swallowing reflex in deep ether anesthesia, blood is aspirated into the lung. The same may occur with poor hemostasis when tonsillectomy is done under local anesthesia.

A group of cases with bronchiectasis was next demonstrated.

*Case 8.*—A girl of 13 years, admitted to the University Hospital about 4 months ago, gave a history of having had whooping cough six years before, since which time there had been cough and sputum. In winter the patient has exacerbations of her complaint. There has been daily slight fever running usually up as high as 100.8° F. The sputum varies between 90 and 350 c.c. Lipiodol filling of the bronchi by the passive method of Ochsner showed cylindrical dilatation of all the bronchi of the left lower lobe with a few saccular dilatations present. There was slight dilatation of a few bronchi on the right but the disease was preponderantly unilateral. A left phrenic exeresis was done with some diminution in the sputum and slight general improvement. After three weeks' observation, pneumothorax was instituted on the left, with definite improvement. The temperature has been normal for more than two months. There is still slight cough but the sputum is only 4 to 20 c.c. daily in amount. The patient has gained in weight and has returned to school.

Dr. Wangensteen stated that a patient had recently been admitted for phrenic exeresis for bronchiectasis in whom Dr. Myers had already carried on pneumothorax compression for four years. The patient had been working consistently, but hoped that elevation and paralysis of the diaphragm would relieve her of a slight residual sputum.

*Case 9.*—A woman of 43 years was presented, who had cough and considerable sputum since the age of 38. There had been considerable weight loss and 175 to 240 c.c. of sputum was brought up daily. Exeresis of the phrenic nerve performed about two months ago had resulted in almost complete disappearance of sputum. There had been a persistence of slight cough, however, and recently the patient has been bringing up a little sputum. She returned to the chest clinic in the Out-patient Department of the University Hospital and was admitted to the hospital for her first pneumothorax treatment, which she received today.

Dr. Wangensteen stated that it was gratifying to note the improvement in the patients with conservative types of treatment. He said that he had not done any complete deribbing operations as practiced by Hedblom in such cases, but stated that Dr. Kinsella and he had worked together on two cases of advanced bronchiectasis in which the conservative procedures of phrenectomy and pneumothorax followed by thoracoplasty over the lower left chest had been inffectual. They had then done the cautery lobectomy of Graham of the involved lung tissue in these two cases.

Dr. Wangensteen called attention to Dr. Graham's observation that many of the cases of bronchiectasis apparently follow infection of the paranasal sinuses. Alton Ochsner has been able to show that lipiodol placed in the nasopharynx is aspirated into the lung during sleep. The satisfactory eradication of sinus infection is therefore an important item in the treatment. In a number of cases of bronchiectasis in which repeated passive filling of the bronchi with lipiodol had been used, as suggested by Ochsner, definite improvement had been observed in only a few isolated instances.

In the next group of cases shown, surgery had been performed for pulmonary tuberculosis. Dr. Wangensteen stated that a demand had been created for this service by the superintendents of the tuberculosis sanatoria of the State, and that ten beds had been set aside at the University Hospital for the surgical treatment of such cases.

*Case 10.*—This young lady, aged 20, had been ill with pulmonary tuberculosis for two years. She had had bed rest at a sanatorium for fifteen months. She has recently maintained her weight and there has been only slight fever. The sputum is positive for tubercle bacilli and varies in amount up to 90 c.c. a day. X-ray examination reveals a large cavity in the lower left lobe. Unfortunately there is already a small cavity in the apex of the right lobe. Pneumothorax had been given on the left over a considerable period, since which time there had been definite improvement. The large cavities in the left lung were still open, however, owing to the presence of broad adhesions, and Dr. Wangensteen was of the opinion that a successful issue did not appear likely unless these could be effectually dealt with. The left diaphragm was not observed to move on fluoroscopy of the chest. The patient has a chronic proliferative type of disease for which compression by thoracoplasty is especially indicated. The small cavity in the apex of the right lung in all probability had its origin from the large ones on the left and if they can be sealed the lesion in the right lung may heal. An upper thoracoplasty in which paravertebral segments of the upper six ribs are removed subperiosteally has been done, and X-ray examination shows considerable diminution of size in the upper cavity. The air in the pleural cavity which would tend to interfere with the

collapse was aspirated before the operative procedure. The patient had little reaction from the procedure and will be ready for the lower stage in a few days, at which time segments of the seventh to the eleventh ribs inclusive will be removed.

Dr. Wangensteen explained that it was important to cut the ribs as close to the spine as possible and that he exposed the articulations of the ribs with the transverse processes of the vertebræ, at which point they were divided. He felt that removal of wide segments of the upper two ribs was very important in obtaining collapse of apical cavities. With the arm pulled forward it was not difficult to sever the first rib as far proximally as the scalene tubercle. It has been pointed out by statistical studies from tuberculosis sanatoria that about 85 per cent of cases with persistent cavities are dead after three years. In event the small cavity on the right fails to heal, an apicolysis or excision of the three upper ribs should be done. In the experimental laboratory of the Department of Surgery at the University, Dr. Kinsella has done very extensive bilateral thoracoplasty in both dogs and monkeys, which procedures seem to be well borne. Bilateral pneumothorax in the treatment of tuberculosis has long been practiced.

*Case 11.*—The X-rays were demonstrated of a girl, aged 25 years, who had had pulmonary tuberculosis for eight years with large bilateral cavities, who was recently referred for thoracoplasty. There was evidence of spreading exudative tuberculosis in the base of one lung, also, and Dr. Myers and Dr. Wangensteen both felt that it was too late to do the patient any good. As in the case just demonstrated, so here the disease for a long time had probably been largely unilateral, at which time thoracoplasty would probably have been an effective remedy.

*Case 12.*—The X-ray films of a woman, aged 32 years, were shown who had a cavity that measured $11 \times 13$ centimeters in the left lung. The patient had been treated with pneumothorax and at one time it was believed that it was a large annular pneumothorax and not a cavity. The sputum level so nicely demonstrated in these films, taken in the standing posture, established the nature of the lesion. A phrenic exeresis followed by three-stage thoracoplasty had been done. After the typical two-stage paravertebral thoracoplasty, the anterior segments of the upper six ribs were also removed through an incision below the axilla between the pectoral and latissimus dorsi muscles. This large cavity was reduced to a cavity measuring $2 \times 3$ cm. in diameter, by these operative procedures. After the last operation, performed about 8 weeks ago, the patient was allowed to go home and she plans to return shortly for X-ray evidence of whether or not the cavity still persists. Persistence of the cavity is synonymous with continuance of the disease. In the event the cavity still persists, an apicolysis is indicated.

*Case 13.*—The next patient, a girl, 22 years of age, had had tuberculosis for six years. After bed rest for a few months she was well for two years, at which time a hemorrhage occurred. During the last three years she had been in bed continuously. Pneumothorax had been ineffectual because of adhesions. Upon admission to the hospital tubercle bacilli were found in the sputum which averaged about 60 c.c. daily. One large cavity and a few small cavities were visualized in the left upper lobe. A phrenic exeresis and a two-stage thoracoplasty had been done. When the patient left the hospital three months ago she had no sputum. She came in today for this presentation and for an X-ray examination. The latter shows a splendid collapse with complete obliteration of the cavities.

*Case 14.*—This patient, aged 50 years, had had tuberculosis for almost thirty years. Twenty-eight years ago he was given bed rest because of tuberculosis. His disease became arrested and he remained well until fourteen years ago, when a breakdown occurred. He had had sanatorium treatment for one year prior to admission. Pneumothorax failed because of adhesions and he was referred to the University Hospital for thoracoplasty. There was daily sputum of 50 to 75 c.c. which was consistently positive for tubercle bacilli. A phrenic exeresis and a two-stage thoracoplasty were done. The large cavity initially present in the upper left lobe had completely disappeared. There is evidence of considerable new bone regeneration from the periosteum of the ribs in these recent films. The patient has no sputum, has gained 28 pounds in weight and has worked steadily for more than a year.

The patients are urged to lie on sandbags as soon as they can tolerate them after the operation. This measure helps to increase the collapse. Dr. Wangensteen felt that better collapse is obtained with thoracoplasty on the left side, owing to the presence of the incompressible liver on the right. Reports from the literature would also indicate that operations on the left side are better tolerated.

Dr. Wangensteen stated that only 13 phrenicectomies without other subsequent compressive operative procedures for tuberculosis had been done at the University Hospital. He felt that phrenicectomy alone had a rather limited value in the treatment of pulmonary tuberculosis. In a rather large number of patients upon whom thoracoplasty was done, an initial phrenic exersis had been done. When the diaphragm was fixed, the improvement resulting from paralyzing it is not likely to be great, even though it may rise somewhat into the chest. Dr. Wangensteen said that, during the two or three-year period since this service had been established at the University Hospital, thoracoplasty had been performed upon 50 patients, representing somewhat more than 100 thoracoplastic operations. In this group there had been two operative deaths; one was an acromegalic with a tuberculosis of long standing with an extremely rigid chest who stopped breathing while the incision was being made. Attempts to resuscitate her proved futile. The other patient had an asthma in addition, from which she was rarely free. Seven ribs were removed and it was hoped that one operative procedure would suffice. An unstable mediastinum and the asthma proved too severe a handicap for her. A graded procedure in this instance would have been much wiser. There had been in addition three hospital deaths, viz., one from amyloid disease

remotely after a three-stage thoracoplasty; one by suicide, and one from miliary tuberculosis. Though thoracoplasty appears to be a rather formidable type of operation, Dr. Wangensteen said that it was surprisingly well tolerated by these patients in rather frail health. The postoperative reaction in women he said was less then in men, owing to the presence of smaller ribs and muscles. In the unilateral chronic non-exudative type of tuberculosis with cavitation in which pneumothorax was of no avail, Dr. Wangensteen stated that thoracoplasty succeeded in returning to health and usefulness a rather large number of patients who would otherwise be resigned to incapacity and a lingering death. Dr. Wangensteen said that there had been a few deaths in his group after the patients had left the hospital, but that the operations were too recent to discuss the end-results.

He stated that Professor Bull, of Oslo, had stated in his introductory address at the Seventh International Conference on Tuberculosis, held in Oslo last summer, that 401 patients had had thoracoplasty performed in Norway since 1914. Of a group of 328 patients operated upon more than two years previously, Professor Bull said that 37.5 per cent had been restored to full activity, 13.4 per cent were considerably improved, and 41.8 per cent were dead.

*Case 15.*—The next patient shown, a girl aged 29, had exhibited an interesting diagnostic problem when admitted to the University Hospital. In the latter part of 1929 she had become ill with cough and pain in the left chest. She had had two small hemoptyses but there had been no sputum. She had been admitted to a sanatorium for the treatment of tuberculosis, but it was decided after a thorough study that she did not have tuberculosis. When admitted here, about eight weeks ago, she complained of severe pain in the left chest and anorexia. She presented an anemic appearance and the hemoglobin was found to be 60 per cent. The fever was of the septic variety, ranging as high as 102 degrees. There was a firm brawny tender mass over the left chest wall involving the breast. There were no sinuses or fistulæ; the skin was a deep brown over the area of induration. An X-ray of the chest showed a mass within the chest as well; a lateral film showed it to be in the anterior portion of the chest. There was slight thickening along the margins of the ribs. Aspiration of the pleural cavity before admission had repeatedly been negative. A lipiodol filling of the bronchi was done and antero-posterior and lateral films were again made. The lung was apparently displaced into the posterior mediastinum by the mass. Two diagnostic impressions were entertained: (1) actinomycosis and (2) endothelioma of the pleura with invasion of the chest wall. It was believed that aspiration of the indurated area in the breast with a large needle and syringe suction would aid in the diagnosis by revealing either sulphur granules or small pieces of tissue which could be embedded in paraffin. After infiltrating the skin with novocaine, a large needle was pushed through the healthy skin beneath the breast and several cubic centimeters of sanguineous fluid was obtained in which scores of tiny sulphur bodies were present. The ray fungus was easily demonstrated by squeezing one of the sulphur bodies between a glass slide and a coverslip in a drop of water. A paraffin block was made from the sediment and a large number of colonies were seen in the stained section. Dr. Wangensteen remarked that the tissue diagnosis of actinomycosis often established the diagnosis when the organisms could not be demonstrated in the fresh exudate. He said that the physician who makes the first puncture has the best chance to make the diagnosis and related that he had once aspirated a lesion in the cheek and observed the sulphur granules. The next morning when he repeated the procedure before his class he was chagrined in failing to demonstrate their presence. Decompression of the lesion permits the exudate to escape, after which the colonies of actinomyces are not easily demonstrated. In such cases when actinomycosis is suggested, Dr. Wangensteen felt that the tissue diagnosis should be depended upon.

A semilunar incision was made beneath the breast and the latter turned upward. Considerable seropurulent exudate came away, in which myriads of sulphur bodies were still present. The anterior segments of the third, fourth and fifth ribs were excised together with a portion of the pleura. The granulomatous type of tissue present was extremely vascular and there was considerable bleeding which was easily controlled by packing. Since the patient was operated upon there has been considerable reduction in fever and the pain in the left chest has disappeared. The appetite is good. The wound in the left chest has healed, but a lateral plate still shows the lung displaced posteriorly and Dr. Wangensteen felt that the patient should be re-operated upon in an attempt to excavate fairly completely the granulomatous tissue. The patient had been on large doses of iodides (5 to 10 grams daily). No X-ray treatment had been employed in this case. Dr. Wangensteen felt that radical excision, combined with the provision for escape of exudate by drainage, was the essential in the treatment. Two previous cases of thoracic actinomycosis that had extended from an uncontrolled cervical actinomycosis had proven refractory to X-ray and radium and both patients died.

The histories and X-ray films of two patients that had been treated for suppurative disease of the lung and pleura, but who proved to have carcinoma of the lung at autopsy, were briefly reviewed.

*Case 16.*—This patient was a man of 49 who had been ill with pneumonia in February, 1930. In May, he was operated upon for empyema and again in August. In October, 1930, he was admitted to the University Hospital with a weight loss of 70 pounds and an anemia (hemoglobin 60 per cent). There was considerable sputum and also drainage from a sinus in the left chest. An X-ray film demonstrated a dense shadow filling the entire left chest. There was relatively little drainage from the sinus in the chest compared with the amount of sputum. Bronchoscopy was negative. It was felt, therefore, that an abscess of the lung was the primary condition and an external drainage was performed just lateral to the heart. A carnified lung was found and pus obtained. The patient's condition im-

proved but he still continued to have fever and sweats. He also had some difficulty in swallowing. At a second operation about three weeks later an attempt was made to open up the old sinus in the chest more widely. As soon as the skin was incised there was a brisk venous hemorrhage without apparent cause. For the first time it was suspected that the patient might have malignancy. This wound continued to bleed occasionally despite rather tight packing and the patient continued to fail and died about three weeks after the last operative procedure.

Autopsy showed a diffuse carcinoma of the entire lung with encirclement of the lower esophagus. A large benign nephroma was also present in the left kidney.

*Case 17.*—A man of 66 had been taken ill with cough and fever in June, 1930. There was rusty sputum of about a week's duration, after which there was subsidence of the fever and the patient returned to work. He did not feel quite well all summer and lost a few pounds in weight despite a good appetite. In September he had periodic chills and fever and a slight unproductive cough. In October, 1930, he was admitted to the University Hospital. Examination showed a large man with some pallor and evidence of wasting. His temperature ran as high as 101° F. daily; physical examination otherwise was essentially negative. X-ray examination disclosed an almost perfectly spherical mass about the size of a tennis ball to the right of the heart and in the anterior mediastinum as seen on the lateral film. Bronchoscopic examination was negative. The contour and location of the homogeneously dense area suggested very strongly a dermoid cyst. The mass was definitely in the lung and was not thought to be a circumscribed Hodgkin's of the lung. Because of the infectious features in the history it was felt best to approach the lesion as though it were an encapsulated empyema or an abscess. During the week that preceded the operation the patient felt that he was gaining rapidly. At operation, performed under local anesthesia, the anterior segments of the second, third, and fourth ribs were removed. A free pleural space was encountered and an iodoform gauze pack was left on the pleura. A week later the wound was reopened, and the mass was needled through the pleura. Pus was obtained and the pleura was incised and a drainage tract was made into the lung with the endotherm knife. When the mass was reached more exudate in which pieces of tissue were clearly visible came away. It was obvious, therefore, that the lesion was a malignant tumor that had broken down. Microscopic examination of the tissue showed adenocarcinoma.

The next morning without warning or obvious cause the patient became suddenly extremely dyspneic. Oxygen afforded only slight relief. Shock quickly supervened and before the patient could be transfused he expired.

Autopsy showed a large carcinoma of the hilum of the right lung with a large fist-sized tumor mass plugging the right atrium and extending through the mitral valve into the left ventricle. The extension of the tumor by way of the pulmonary vein directly into the heart served as a satisfactory explanation for the sudden dyspnea and shock. The not infrequent complication of brain abscess in pulmonary suppuration of various types, Dr. Wangensteen said, had its explanation in this mode of spread. Such abscesses occur in the left cerebral hemisphere, he said, in about 75 per cent of instances.

Dr. Wangensteen commented on the difficulties of making an early diagnosis of carcinoma of the lung and on the several sources for confusion. He believed that there are no early symptoms on which the diagnosis can be made with assurance. Reliable bronchoscopic examination and X-ray films, together with a critical analysis of the history, he felt, were of most value. Unfortunately the treatment of carcinoma of the lung is as unsatisfactory as its recognition. Most primary carcinomas of the lung begin in the main bronchi; a lesser number start in the parenchyma. These latter tumors should be amenable to surgical excision (lobectomy) or destruction with the cautery. Professor Sauerbruch had obtained 3- to 5-year cures in the bronchi is early recognition by bronscopy and hope of dealing satisfactorily with the more numerous group of primary carcinomas of the lung that originate in the chonchi is early recognition by bronchoscopy and endoscopic treatment with radium and diathermy. Kernan, of New York City, Dr. Wangensteen said, has reported such a case in which the tumor completely disappeared under such treatment. The symptomatology, diagnosis, and treatment of carcinoma of the lung all need intensive study and clarification.

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Dr. E. K. Green made a motion that a vote of thanks be given the Surgical Staff and Superintendent for the fine program which had been presented, and for the dinner preceding the program.

Dr. A. T. Mann said that personally he felt as though he had been at a rather full program of the Tri-State and also expressed the thanks of the Surgical Society.

Dr. Wangensteen replied that it had been a pleasure to have the opportunity of entertaining the Society in this way.

H. O. McPheeters, M.D.,
*Secretary.*

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## ZINC CHLORIDE IN CANCER

The use of zinc chloride and similar caustics in the treatment of cancer has been practically abandoned by all except the "cancer cure" quacks. Such caustics are difficult of control, so that there is destruction of healthy, as well as of malignant, tissue; their action is slow, thus unnecessarily prolonging the pain of removal. Much better results can be obtained by the judicious use of surgery when the growth is operable, or by the use of radium and roentgen rays when the disease has advanced beyond the chance of its complete removal. The use of such caustics has been abandoned also by the progressive dermatologists in the treatment of small epitheliomas of low malignancy; they use, instead, radium, roentgen rays, or coagulation with high frequency currents. (Jour. A. M. A., March 7, 1931, p. 797.)

# PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

## SECTION SUPERVISORS

EYE, EAR, NOSE AND THROAT

Virgil J. Schwartz, M.D.
617 Medical Arts Bldg.
Minneapolis, Minnesota

Merritt Wheeler, M.D.
1027 Lowry Med. Arts Bldg.
Saint Paul, Minnesota

GYNECOLOGY AND OBSTETRICS

Archibald L. McDonald, M.D.
Lyceum Building
Duluth, Minnesota

L. W. Barry, M.D.
810 Lowry Medical Arts Bldg
Saint Paul, Minnesota

MEDICINE

Richard Bardon, M.D.
205 West Second Street
Duluth, Minnesota

Thomas A. Peppard, M.D.
Medical Arts Bldg.
Minneapolis, Minnesota

PEDIATRICS

Chester A. Stewart, M.D.
951 Medical Arts Bldg.
Minneapolis, Minnesota

Roy N. Andrews, M.D.
Mankato Clinic
Mankato, Minnesota

ROENTGENOLOGY

Leo G. Rigler, M.D.
University Hospital
Minneapolis, Minnesota

J. D. Camp, M.D.
Mayo Clinic
Rochester, Minnesota

SURGERY

A. E. Sohmer, M.D.
Mankato Clinic
Mankato, Minnesota

O. J. Campbell, M.D.
Medical Arts Bldg.
Minneapolis, Minnesota

# MEDICINE

## TUBERCULOSIS ABSTRACTS*

When as a young man Sir Robert Philip, now professor of tuberculosis in the University of Edinburgh, announced his intention of specializing in tuberculosis, one of his wisest and kindest teachers said, "Don't think of such a thing. Phthisis is worn to a very thin thread. The subject is exhausted." Fifty years of untiring labor and leadership have dimmed neither the zest nor the perceptions of this pioneer. Recently, Sir Robert delivered the Malcolm Morris Memorial Lecture on "The Outlook on Tuberculosis." After reviewing the past, he sounded the call for fresh orientation. Advanced disease of the lung, he said, has absorbed most of our interest in the past; it is time to shift attention more and more towards the earliest indications of tuberculosis infection. In this number of "Tuberculosis Abstracts," there is space only for comment on this phase of tuberculosis control. Sir Robert Philip's interesting and comprehensive monograph was published in the British Medical Journal of January 10, 1931.

*Reprinted from Tuberculosis Abstracts, a review for physicians issued monthly by the National Tuberculosis Association June, 1931, Vol. IV, Number 6.

### Determining Earliest Indications of Infection

Pulmonary tuberculosis is in reality a late, visceral manifestation of an infection contracted much earlier. The author has had opportunity in numerous instances to trace the development of tuberculosis in the same subject in ever-changing form from the seed stage up to full fruition; in some instances, for 30 years or more. The ebb and flow—the arrest and advance of the disease—are but expressions of the continuing contest between the invading organism and the resistance of the tissues of its host. While the invading organism is presumably little changed save in respect of numbers, the resistance offered varies endlessly as a result of intercurrent illness; accident, strain, and a host of environmental influences. Infection is the crossing of the frontier—the beginning of what is often a lifetime contest.

### Scientific Anticipation

The hope of preventing the endless possibilities of subsequent mischief following infection led the author some years ago to recommend the systematic examination of contacts. The next step was to advise the search for the earliest traces of tuberculous infection in every child. As infection takes place most commonly during childhood, the tuberculin test, he believed, should become routine practice at stated intervals from early infancy onward. So long as the reaction remains negative, nothing further is necessary. Whenever a positive reaction is obtained for the first time, the fact and the date should be recorded on the permanent medical history of the child.

If, after positive determination, the health of the child continues thoroughly good, we have the knowledge that the child's resistance is sufficient, and there is no call for treatment. On the other hand, the positive determination may illuminate many after-events. Vague conditions of "delicacy" in the child may find their explanation—for example, malnutrition, obscure feverish attacks, ill-defined lack of energy, so-called "disturbed action of the heart," which may interfere with the claims of education and sport. Such conditions are very frequently the expression of tuberculous infection. Further, the occurrence of incidental illnesses, such as measles and whooping-cough, will call for watchfulness, and care will be taken to secure complete convalescence after such attacks. The doctor will insist on the maintenance of a high level of resistance, more particularly in relation to school life, the period of adolescence, and the time of entrance into more responsible life.

### DETERMINE THE FACT AND DATE

Preventive medicine may wisely take a lesson from the sphere of agriculture. The practical farmer who seeks to raise a tubercle-free herd has learned the value of the tuberculin test. A method for the early detection of tubercle which is worth the farmer's while on economic grounds has still greater significance and wider efficacy—both medically and economically—in dealing with the human race.

Sir Robert Philip would not make a formal distinction between reactors and non-reactors but recommends the routine practice of determining the *fact* and *date* of the initial infection in every child. That is a service which might well commend itself to the American physician, who is growing increasingly interested in preventive medicine and strives to render to his families a positive health service.—*The Outlook on Tuberculosis: Changing Orientation, Sir Robert Philip, The British Med. Jour., Jan. 10, 1931.*

### Paper Stimulated Wide Interest

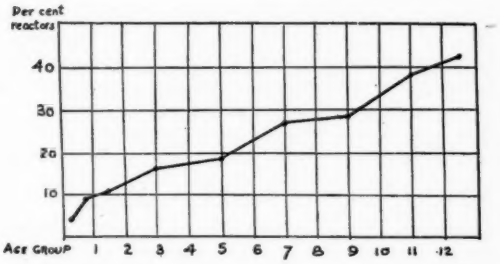
Sir Robert's paper immediately stimulated much discussion among the medical profession of England and Scotland. The comments were, on the whole, favorable, and reflected the deep respect which is felt by doctors and laymen for the genius and leadership of the author. To him, said one writer, is due almost entirely the present favorable position of the campaign against tuberculosis. The comments, together with Sir Robert's final rebuttal, were printed in subsequent issues of the *British Medical Journal.* Some of these are briefly abstracted below.

Robert Carswell raised this question: Supposing the fact and date of tuberculization has been duly noted in relation to each child; what practical use is now to be made of the information? Excluding specific methods of immunization or "detuberculization," Sir Robert Philip's answer, he says, is too nebulous. He believes that a more definite attempt should be made to immunize the child (presumably by some form of vaccination). In spite of many failures, there has been sufficient success with preventive immunization, supported by ordinary hygienic measures, to make it more than a hope, and he submits that demonstration to prove the value of detuberculization is the next most important step in the campaign against tuberculosis.

### TEST A CLUE TO SOURCE OF INFECTION

John Gibbens takes issue with that part of the essay which implies that malnutrition, obscure feverish attacks, lack of energy, and the like may be the expression of tuberculous infection in a child who reacts positively to the tuberculin test. Tuberculosis carries with it too great a stigma to justify anyone in diagnosing it easily in such delicate children. The value of the positive Mantoux test, he says, lies rather in stimulating the doctor to get the child back to full health as rapidly as possible. Gibbens admits that knowledge of the fact of tuberculization is extremely important but for another reason; namely, that the earlier the age at which a positive reaction is found, the more likely is one to find the adult that is disseminating the infection.

W. Camac Wilkinson emphasized that the environment of the child is the source of infection. Too much attention cannot be paid to the environment of the child if we wish to tackle infection at its source. "Neither fresh air nor sunshine can prevent tuberculosis in children living in the houses of consumptive parents."—*The British Med. Jour., Jan. 24, 1931.*




**Mantoux Reactions of 1,286 Children—Bellevue Hospital, New York, from 1921 to 1928. (From Tuberculin Skin Reactions, C. H. Smith, Am. Jour. Dis. of Children, Dec., 1929.)**

Sir Robert Philip in his answer disclaims responsibility for misunderstandings voiced and reiterates that to the question, "Have we reached finality?" an emphatic negative must be given. He repeats his plea for the systematic search for, and determination of the fact and date of initial infection in every child, primarily so that the information may be kept in view throughout the further life-history of the individual in order that, if indications of progressive tuberculization supervene, they may timeously be met by measures of detuberculization.—*The British Med. Jour., Feb. 7, 1931.*

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THE EFFECT OF LESSENED RESPIRATORY RESERVE ON BLOOD AND CIRCULATION: Willis S. Lemon (Arch. Int. Med., Vol. 45, No. 1). This study deals with the effects produced on the respiratory reserve by lessened mechanical efficiency, and an attempt to discover the point at which reserve is lost, at which respiration, as a function, is inadequate, and at which circulatory aid is required so that an animal can maintain a comfortable existence.

Avulsion of all intercostal nerves on left side of dog was performed ten days later; the same thing was done on right side. One week later, phrenic neurectomy was performed on right side. Five days after, a left phrenic neurectomy was performed. Breathing was now dependent on extra-respiratory muscles in neck and shoulders, and to muscles attached to ribs on the vertebral side of the operative sites.

The behavior of the dog was similar in respects to other dogs which were normal. It could not, however, respond to vigorous exercise with the same ease because the vital capacity was lessened. The animal was thus still capable of ordinary activities, and with

the ability to develop a vital capacity in excess of tidal air requirements.

The introduction of phrenic neurectomy does not alter in any way the movement of the chest wall. Asymmetry and reduction of outward lateral movement occur when the intercostal nerves on one side are sectioned. The reduction of movement amounts to from 30 to 50 per cent of normal, depending on the number sectioned. Symmetry and bilateral reduction of movement result in bilateral section of the intercostal nerves.

The dog was allowed to live under normal conditions and surroundings for one year. He developed normally and did not experience any difficulty either in urination or defecation, despite paralysis of the whole diaphragm and of the upper abdominal muscles. The muscles of the lower abdomen underwent hypertrophy. Respiratory movements were normal, and he was dyspneic only after unusual exertion. He could run up and down stairs without embarrassment.

One year after the last previous operation, abdominal cavity was opened and diaphragm was resected from its ventral attachment. It was noted that whole diaphragm had taken a position high in the thorax and atrophy was so excessive that the muscular portion could not be distinguished from the tendinous portion, except with difficulty, and whole diaphragm so thin that lungs were plainly visible through it. The dog now learned to breath differently, the chest raised as one piece during inspiration, and at the same time the abdomen contracted strongly.

The three functions of the diaphragm—respiratory, pressure-producing, and partition-effecting—were almost completely destroyed.

Ten months later, the abdominal cavity was again opened. The stomach, duodenum, and all but two lobes of the liver had forced their way into the thorax. The diaphragm was detached from side to side, and backward as far as possible. After recovery from the operation, the dog was healthy and active and did not show any evidence of respiratory embarrassment.

The studies showed: 1. Vital capacity was lessened, but never beyond the point where it failed to be equivalent to tidal air. The ventilation in liters of air breathed each minute reached a high normal amount, but was not distinctly abnormal at any time.

2. The hemoglobin decreased from high to low normal percentages, but the normal amount of hemoglobin for each 100 c.c. of blood was within normal limits.

3. The number of erythrocytes failed to indicate either temporary or permanent erythrocytosis, such as might have been anticipated had respiratory competence been destroyed.

4. The arterial and venous oxygen content and the oxygen of the blood were essentially normal.

5. The heart remained normal functionally, and has not shown evidence of hypertrophy, and the electrocardiogram cannot be interpreted as evidence to indicate any definite failure of the right ventricle.

The experiment illustrates the degree to which muscular dysfunction may be carried before respiratory incompetence develops in an animal which has normal heart and lungs. It seems to confirm the independence of two fundamental functions having interrelated duties; great loss of reserve in one is required before demonstrable evidence of coöperative support is provided by the other.

E. T. JOHNSON.

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NON-APICAL INFILTRATIONS IN PULMONARY TUBERCULOSIS. Karl Fischel (Amer. Rev. of Tuberc., 1931, XXIII, 139). To diagnose pulmonary tuberculosis in its earliest stages we must locate the lesion in many instances before symptoms appear and even before physical signs can be detected. The small centrally located focus may be active and spreading while the patient is apparently in good health. Assman was one of the first to report such foci in the infraclavicular area. Serial X-ray films make their identification possible. Redcker and others have shown that pulmonary tuberculosis usually begins in this manner and that tuberculosis limited to the apex is a comparatively late manfestation of the disease and is frequently evidence of a conflict already won while isolated lesions lower down have a much graver significance. Their views have been confirmed by various German, English and American writers.

Fischel discusses the relation of these lesions to Ranke's theory which recognizes three stages in tuberculosis. Ranke's primary complex is now generally known in this country as the primary or childhood type of tuberculosis and includes the primary Ghon lesion and the enlarged regional lymph glands which accompany it. It is predominantly a tuberculous lymph adeitis. This primary lesion of tuberculosis is accompanied by a profound, modification of all the tissues of the body (allergy) so that they are hypersensitive to the tubercle bacillus and its products.

Ranke's second stage begins with the first reinoculation of the allergic animal body. Inflammatory changes consisting of hyperemia, edema, emigration of leukocytes, etc., make up the anatomical picture of the focus of reinfection. The early non-apical infiltrations which Fischel considers the usual beginning of serious pulmonary tuberculosis in adults are accompanied by the inflammatory changes characteristic of a second infection with tubercle bacilli of tissues made hypersensitive by a previous infection somewhere in the body.

We are really dealing with an acute bronchopneumonia surrounded by an area of perifocal inflammation and in no way walled off from the surrounding tissue. It has free communication through the bronchi, blood vessels and lymphatics with other parts of the body. The fate of the patient at this critical period depends on the stabilization of his immunity. If he is not overwhelmed by his extreme hypersensitiveness, the lesion may quickly heal and disappear, providing the patient is given prompt treatment. In many cases if he becomes toxic and the lesion is apparently spreading rapidly, producing caseation and cavities, immediate pneumothorax will often turn the balance in the patient's favor and save his life.

Fischel believes the proper interpretation of the lesions found in so-called apical tuberculosis is that they are the late results of favorable cases. Fairly extensive subapical lesions have eventually involved the apices. Retrogression and healing have been slower there and changes may persist after the lesion below the clavicle or in the middle field have disappeared. As far as X-ray and physical signs are concerned, any lesion in the subclavicular region will tend to diminish the elasticity of the lung above.

The importance of frequent X-ray examinations of exposed individuals and the most prompt and careful hospital study of suspected cases are emphasized.

A. T. LAIRD.

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CASES OF PULMONARY TUBERCULOSIS WITH EARLY CAVITY FORMATION AND FEW SYMPTOMS (Tuberculoses torpides cavitaires d' emble'e). E. Buc (Revue de la Tuberculose, 1930, X, 1096). "In certain cases one finds completely softened tubercles in the midst of crepitant lung tissue, and in these cases the walls of the cavities are smooth and seem to be formed only by lung tissue a little compressed or thickened but without any trace of a false membrane." So wrote Laennec, nearly a hundred years ago.

Buc states that cavities are not always the result of the breaking down of large caseous foci and claims that they may appear very quickly, even in a few days, at the very start of a rapidly developing tuberculosis; in fact they are often the first demonstrable lesions in cases that eventually become chronic. Without doubt from an anatomic point of view, the loss of substance is caused by the breaking down of a small caseous area, but this produces practically no clinical phenomena.

The cavity is almost always an unexpected discovery during an X-ray examination. As noted above, very few symptoms accompany its formation. There may be a persistent cough which annoys the patient or a small amount of sputum which is very viscid. Sometimes this expectoration is present at the very beginning; in other cases it is preceded by a few acute symptoms, a slight hemoptysis, or a febrile attack lasting a few days, or loss of weight and strength may be noted.

These symptoms are likewise often of very recent origin and have been present only a few weeks before the X-ray shows a cavity about which there can be no doubt, of considerable size. At this time the cavity is the principal lesion seen, it is isolated and solitary. The broncho-vascular trunks may appear thickened but the parenchyma appears practically normal. Consecutive films show the formation and increase in size of such cavities. At first their contours may be faint and indistinct, while the surrounding tissue is not much different from the normal lung. This is Jacquerod's first stage of cavity formation. In other cases although symptoms have lasted only a few weeks the cavity is already large, with definite borders and it is surrounded by an area of lessened density. One might think the cavity was much older than the history of the case would lead one to suppose. It is impossible to say from the film how long the cavity has existed, but there can be no doubt that it may appear without preceding consolidation of any great extent.

Outside of X-ray study, sputum examination is the most useful diagnostic procedure in these cases. The amount of sputum is usually very slight and patients may even say they do not expectorate; others will admit that they occasionally expectorate a small amount. Sometimes examination of feces will give positive results. When the cavity is present and enlarging, tubercle bacilli are usually found in spite of the paucity of symptoms. The syndrome really consists of three elements: X-ray evidence of cavity, positive sputum and comparatively good general condition. Cavities may persist unchanged even for an entire year or more. Increase in weight may mislead one as to the seriousness of the condition. The spontaneous disappearance of such cavities is much less rare than is the case with other cavities due to tuberculosis. Often no trace remains. Of twelve cases, six underwent spontaneous cure under sanatorium care. Symphisis of the pleura seems to occur rather frequently in cases with cavities of the type under consideration. Artificial pneumothorax and phrenicectomy are valuable when there is no tendency to spontaneous disappearance, but they are not employed until a period of observation of several months at the sanatorium has demonstrated that no such tendency is present. In suitable cases they are most valuable, as they are followed by rapid disappearance of tubercle bacilli from the sputum. This is very important, since often on account of the appearance of good health and freedom from symptoms these patients are very dangerous to those who live with them.

A. T. LAIRD.

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## PEDIATRICS

TUBERCULOSIS. Allergic, anaphylactic and immune reactions in guinea pigs following inoculations with heat-killed tubercle bacilli. A. Branch and H. R. Cuff (Jour. Infect. Dis., 47:151, Aug., 1930). Branch and Cuff found injections of heat-killed virulent tubercle bacilli, when given in sufficient dosage and concentration by intraperitoneal, intrapleural, intratesticular or subcutaneous routes in guinea pigs, to set up a state of allergy in the inoculated animal, as evidenced by positive intracutaneous and testicular reactions to old tuberculin and by positive Pfeiffer phenomena when living virulent organisms are injected. The most rapid and intense reactions follow intratesticular inoculations. The least constant and slightest reaction is elicited by subcutaneous inoculations. Failure to develop allergy was noted following intracardiac, intravenous and intramuscular administration of doses of three to five mg. The development of allergy following injections of heat-killed virulent tubercule bacilli thus varies considerably, depending on where the dose is administered. Allergy may develop in fifteen days of inoculation with three mg. of heat-killed tubercle bacilli in the peritoneum or pleura, but in their experimental animals anaphylaxis did not appear until at least three weeks

after the inoculations. They feel, therefore, that allergy and anaphylaxis are not directly related. Furthermore, allergy is a phenomenon distinct not only from immunity but also from anaphylaxis as shown by the fact that some intramuscularly inoculated guinea pigs that are non-allergic to old tuberculin, yet develop typical lethal shock when old tuberculin is inoculated directly into the blood stream; allergic guinea pigs may show anaphylaxis but not always.

In general Branch and Cuff conclude that allergy and anaphylaxis in tuberculosis are independent phenomena, and that immunity may be present without allergy. In addition intramuscular (and probably intravascular) injections of heat-killed tubercle bacilli produce immunity and anaphylaxis without allergy, whereas intraperitoneal, and intrapleural injections produce all three of the above conditions. They feel that the practicability of prophylactic immunization of children by intramuscular inoculations with heat-killed virulent bacilli is suggested, the advantage being that if immunity can be obtained without allergy, the valuable tuberculin skin test, if later positive, is evidence of reinfection and not the result of vaccination.

C. A. Stewart, M.D.

## SURGERY

THE CONSERVATIVE TREATMENT OF PREPATELLAR BURSITIS. Louis Carp (Surg., Gynec. & Obstet., January, 1931, Vol. 52, pp. 87-91). Twenty-seven consecutive cases of acute or chronic prepatellar bursitis were studied to determine the end-results of conservative therapy. The technic consisted of evacuating the fluid as compplete ly as possible and injecting 2 to 5 c.c. of 3.5% tincture of iodine into the bursa. The needle was withdrawn and the skin over the bursa massaged vigorously. The knee was placed in complete extension and a pressure bandage applied. In 60 per cent of the cases small amounts of fluid re-accumulated. Aspiration of this fluid was employed; a second injection of the tincture of iodine usually was not necessary. Twenty-four cases were followed an average of 16 months and showed no symptoms or reappearance of the bursal fluid.

Herbert A. Carlson, M.D.

## NEW AND NON-OFFICIAL REMEDIES

### TRUTH ABOUT MEDICINES

*Pollen Extracts-Arlco.*—The following pollen extracts-Arlco (New and Nonofficial Remedies, 1930, p. 29) have been accepted: Birch Mixture Pollen Extract-Arlco; Maple Mixture Pollen Extract-Arlco; Oak Mixture Pollen Extract-Arlco. Arlington Chemical Co., Yonkers, N. Y. (Jour. A. M. A., March 7, 1931, p. 773.)

*Iopax.*—Sodium 2 - oxo - 5 - iodopyridine - N - acetate, Iopax contains from 42 to 43.5 per cent iodine. It is proposed for use intravenously in radiographic visualization of the urinary tract. It is also used for injection into the renal pelvis through the ureteral catheter for pyelography. The maximum intravenous dose is 30 Gm. of the powder dissolved in 100 c.c. of redistilled water. Schering Corporation, New York. (Jour. A. M. A., March 14, 1931, p. 859.)

*Nupercaine-Ciba.*—a-butyloxycinchoninic acid, γ-diethylethylenediamide hydrochloride. Nupercaine was first introduced as percaine. Nupercaine is a local anesthetic, acting like cocaine when applied to mucous surfaces and like procaine or cocaine when injected, the action being relatively prolonged. Nupercaine is about five times as toxic as cocaine when it is injected intravenously into animals, and its anesthetic activity is correspondingly greater than that of cocaine when it is applied to a mucous surface; it is many times more active than procaine hydrochloride when it is injected subcutaneously. It is reported to have caused necrosis of tissue in one case and a condition resembling gangrene with recovery in another. Death has been reported after the subcutaneous injection of 135 c.c. of a solution of 1 in 1,000. The usual precautions should be observed when it is injected into the spinal canal or into the urethra. Nupercaine is supplied in the form of crystals; ampules buffered solution 2 c.c., 1:200; ampules solution 5 c.c.; 1:1,000; solution 2 per cent, and tablets, 0.05 Gm. Ciba Company, Inc., New York. (Jour. A. M. A., March 21, 1931, p. 946.)

*Schick Test.*—A diphtheria immunity test (New and Non-official Remedies, 1930, p. 380) marketed in packages of one capillary tube containing undiluted diphtheria toxin standardized, sufficient for ten tests, accompanied by sterile diluent; in packages of one capillary tube containing undiluted diphtheria toxin standardized, sufficient for fifty tests, accompanied by sterile diluent; in packages of two capillary tubes containing undiluted diphtheria toxin standardized, sufficient for one hundred tests, accompanied by sterile diluent. As a means of control the Schick test control is supplied. National Drug Co., Philadelphia.

*Ephedrine Hydrochloride-Gane and Ingram.* — A brand of ephedrine hydrochloride-N.N.R. (New and Non-official Remedies, 1930, p. 168). Gane and Ingram, Inc., New York.

*Ephedrine Sulphate-Gane and Ingram.*—A brand of ephedrine sulphate-N.N.R. (New and Non-official Remedies, 1930, p. 170). Gane and Ingram, Inc., New York.

*Tuberculin Old (Human).*—Tuberculin-Koch (New and Non-official Remedies, 1930, p. 358) marketed in single 1 c.c. vial packages; also in packages of one 4 c.c. vial. National Drug Co., Philadelphia. (Jour. A. M. A., January 3, 1931, p. 39.)

*Pollen Extracts-Cutter.*—The following pollen extracts-Cutter (New and Non-official Remedies, 1930, p. 31) have been accepted: Oak Pollen Extract-Cutter; Western Ragweed Pollen Extract-Cutter; Western Water Hemp Pollen Extract-Cutter. Cutter Laboratory, Berkeley, Calif.

*Winthrop Viosterol in Oil 250 D.*—A brand of vios-

terol in oil 250 D-N.N.R. (New and Non-official Remedies, 1930, p. 410; Jour. A. M. A., October 4, 1930, p. 1021). Winthrop Chemical Co., Inc., New York. (Jour. A. M. A., January 24, 1931, p. 271.)

*Tetanus Gas Gangrene Antitoxin (Lederle) Refined and Concentrated.*—An anaërobic antitoxin (New and Non-official Remedies, 1930, p. 343) prepared by immunizing horses with gradually increasing doses of the toxins of *B. tetani, B. perfringens,* and Vibrion septique. The toxins are individually prepared. The product is marketed in packages of one syringe containing one prophylactic dose, stated to represent tetanus antitoxin 1,500 units, perfringens antitoxin 1,000 units and Vibrion septique antitoxin 10 units. Lederle Laboratories, Inc., Pearl River, N. Y.

*Gas-Gangrene Antitoxin (Polyvalent) Refined and Concentrated, Without Tetanus Antitoxin.*—An anaërobic antitoxin (New and Non-official Remedies, 1930, p. 343) prepared by immunizing horses with subcutaneous injections of gradually increased doses of the toxins of *B. perfringens,* Vibrion septique, *B. oedematiens, B. sordelli and B. histolyticus.* The toxins are individually prepared. The product is marketed in vials containing one minimum therapeutic dose, stated to represent perfringens antitoxin 10,000 units, Vibrion septique antitoxin 100 units, *B. oedematiens* antitoxin 200 units, *B. sordelli* antitoxin 200 units, and *B. histolyticus* antitoxin 25 units. Lederle Laboratories, Inc., Pearl River, N. Y.

*Tablets Amytal, ¼ grain.*—Each tablet contains amytal (Jour. A. M. A., October 18, 1930, p. 1178), ¼ grain. Eli Lilly & Co., Indianapolis.

*Ampules Gold Sodium Thiosulphate-Abbott, 0.01 Gm.*—Each ampule contains gold sodium thiosulphate-Abbott (Jour. A. M. A., December 20, 1930, p. 1913), 0.01 Gm. Abbott Laboratories, North Chicago, Ill.

*Sulpharsphenamine-Metz, 0.75 Gm. Ampules.*—Each ampule contains sulpharsphenamine-Metz (New and Non-official Remedies, 1930, p. 72), 0.75 Gm. H. A. Metz Laboratories, Inc., New York.

*Sulpharsphenamine-Metz, 0.9 Gm. Ampules.*—Each ampule contains sulpharsphenamine-Metz (New and Non-official Remedies, 1930, p. 72), 0.9 Gm. H. A. Metz Laboratories, Inc., New York.

*Sulpharsphenamine-Metz, 3.0 Gm. Ampules.*—Each ampule contains sulpharsphenamine-Metz (New and Non-official Remedies, 1930, p. 72), 3.0 Gm. H. A. Metz Laboratories, Inc., New York. (Jour. A. M. A., January 31, 1931, p. 357.)

*Diphtheria Toxoid.*—This product (New and Non-official Remedies, 1930, p. 365) is also marketed in packages of five immunization treatments, in packages of fifty immunization treatments. For the two dose method of treatment the following forms are marketed: packages of one immunization treatment; packages of five immunization treatments; packages of ten immunization treatments, consisting of one vial; packages of fifteen immunization treatments, consisting of one vial; packages of fifteen immunization treatments consisting of thirty vials; in packages of fifty immunization treatments, consisting of one hundred vials. The National Drug Co., Philadelphia.

# BOOK REVIEWS

**Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.**

## BOOKS RECEIVED FOR REVIEW

HEART DISEASE. Paul Dudley White, M.D., Instructor in Medicine, Harvard Medical School; physician, Massachusetts General Hospital, Boston. 931 pages. Illus. Price: $12.00. New York: The MacMillan Company, 1931.

FUNDAMENTALS OF DERMATOLOGY. Alfred Schalek, M.D. Professor of Dermatology and Syphilology, University of Nebraska, Rush College, etc. 247 pages. Illus. Price: $3.00. Cloth. Philadelphia: Lea & Febiger, 1931.

TREATMENT OF INJURY BY THE GENERAL PRACTITIONER. Clay Ray Murray, M.D., F.A.C.S. Assistant Professor of Surgery, College of Physicians and Surgeons, Columbia University, etc. 2 Vols. 412 pages. Illus. Price: $5.00, flexible binding. New York: Harper & Brothers, 1931.

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HANDBOOK OF ANATOMY, BEING A COMPLETE COMPEND OF ANATOMY. James K. Young. Revised by George W. Miller. 7th rev. ed., with 154 engraving, some in colors. Philadelphia, F. A. Davis Co., 1930.

This book is leather bound and the printing is clear and large so that it is easily read. There are 426 pages and 154 diagrams and plates. The purpose of this book as stated in the preface is "to lighten the labor of the student of medicine," and I believe that the book accomplishes that purpose. The book is clear, brief, and concise. Tables and diagrams are utilized to fix the different systems in the student's mind. The book is complete in every department and because of its conciseness is a valuable reference book.

A. N. BESSESEN, JR., M.D.

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CLINICAL ALLERGY, PARTICULARLY ASTHMA AND HAY FEVER: MECHANISM AND TREATMENT. Francis M. Rachemann, M.D. 588 Pages and 30 Illustrations. Price $10.50. New York: The MacMillan Co.

During the past fifteen years the increasing interest in the allergic diseases has resulted in the formation of clinics and special societies for its study and individuals have also recorded their numerous observations. From this work has come a vast amount of literature on the subject in all its phases, some of it controversial or contradictory but much of it fairly well proven at the present time and forming the foundation on which our present knowledge of allergic conditions rests.

In this monograph the author, with great patience and much hard work, has reviewed the entire literature

and has interpreted it, without bias, in the light of his own clinical experience at the Massachusetts General Hospital. The subject matter is very well arranged, and ably and fully presented. The first half of the book, covering the phenomenon of hypersensitiveness, explains the various theories of its nature and origin recognized at the present time. There are several excellent chapters on vaccine therapy and the mechanism of the tuberculin test. The second half of the book is devoted to the diagnosis and treatment of the various allergic diseases, especially hay fever and asthma.

This monograph is without question the most complete, thorough and modern of the various works on allergy. Anyone interested in the subject will find in it much food for thought as well as many valuable suggestions for the diagnosis and treatment of conditions which are usually puzzling. The bibliography is most complete and valuable for reference purposes.

E. V. KENEFICK, M.D.

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MENTAL ASPECTS OF STAMMERING. C. S. Bluemel, M.A., M.D. Clinical Instructor in Neurology at the University of Colorado School of Medicine. Pages 152. Cloth. Price $2.50. Baltimore: The Williams and Wilkins Company, 1930.

This book, complete in itself, is in a way supplementary to the author's previous work, "Stammering and Cognate Defects of Speech" (G. E. Stechert and Company, New York and London, 1913). It is intended, primarily, for school use, but is also written for those stammerers who must train themselves.

The book is divided into two parts. The first, "Stammering—An Impediment of Thought," comprising the first four chapters, is given over to a brief consideration of the general characteristics of stammering and to the statement of the writer's theory that stammering is a phase of psychoneurosis in which the afflicted individual is confronted with a momentary break in the continuity of consciousness regarding more particularly the auditory component of verbal image, namely, "stammering is an impediment of thought and not an impediment of speech."

In part two, the remaining eight chapters, "Thought Training as the Basis of Speech Correction," the author discusses the principles of speech correction and their application to kindergarten children and grade-school children, and adults and high-school children. Bluemel feels that before any and every attempt at speech the pupil must "tranquilize his emotions, formulate his thought completely" and breathe correctly. The particular responsibilities of the instructor and of the parent are then given special consideration and the writer concludes the work proper with a word of advice to the student.

This book is clearly and concisely written throughout and is most logical and sincere. It is a work which well deserves the careful consideration of the older children and adults who stammer and the parents of children who present this problem, as well as that of physicians and educators who are intimately associated with such individuals.

WALTER P. GARDNER, M.D.

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